THE
FAR EASTERN REVIEW
ENGINEERING FINANCE COMMERCE

遠東時報

上海仁記路拾六號

MAY 30

MANCHURIA—A SURVEY

RED JOURNALISM

STRIKE ECONOMIC, THEN POLITICAL, NOW ECONOMIC AGAIN

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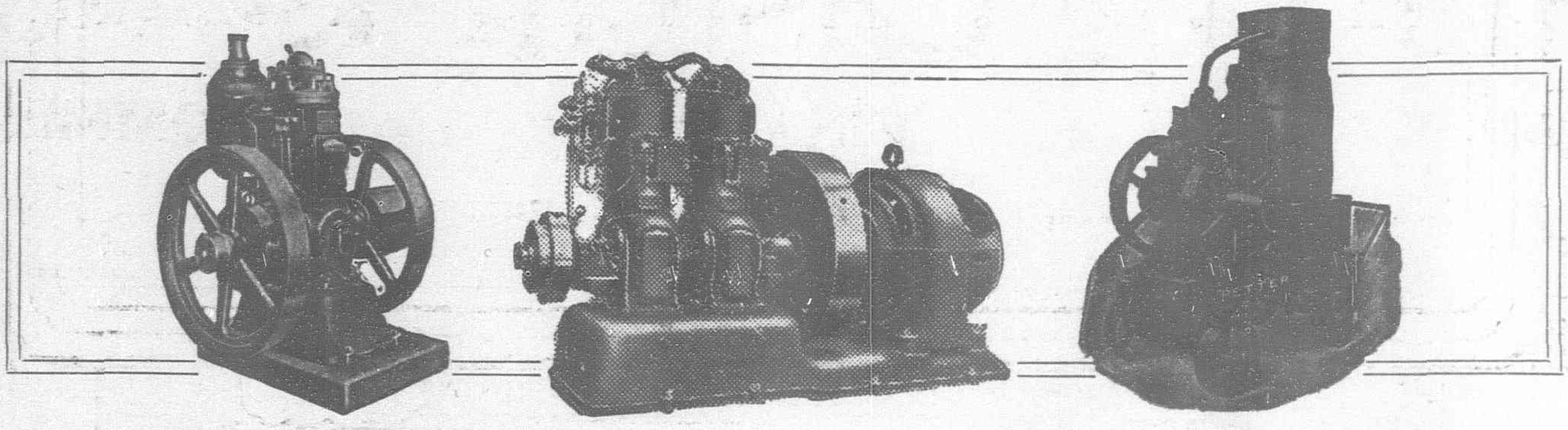

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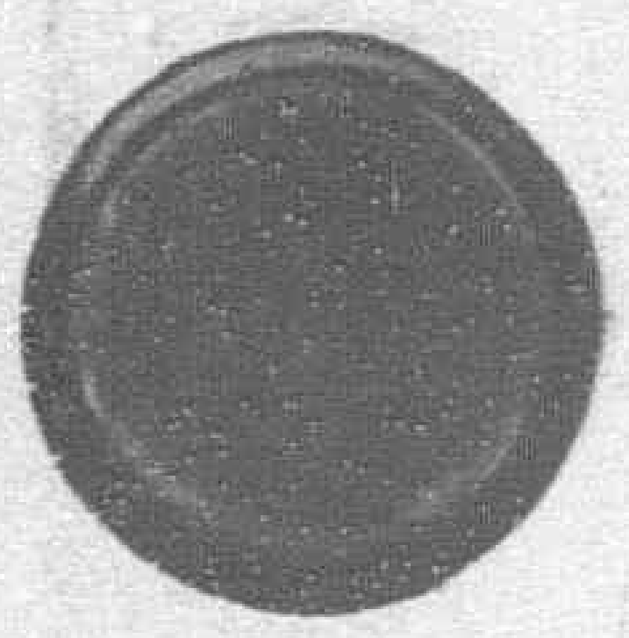

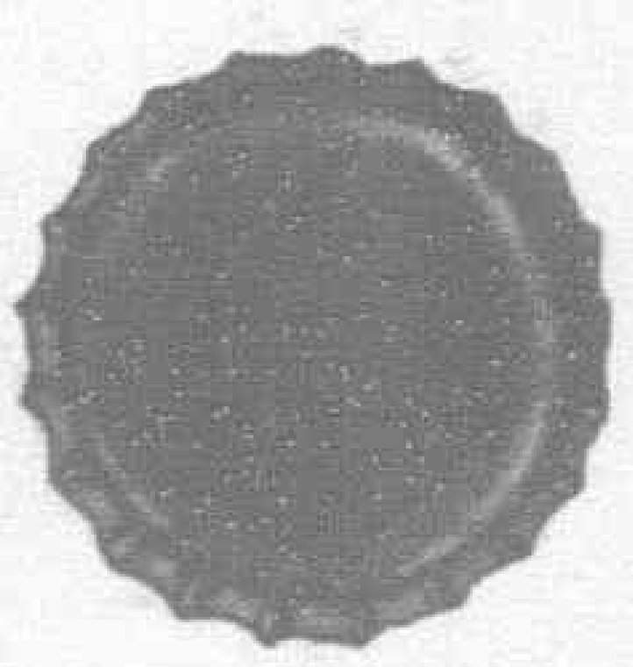

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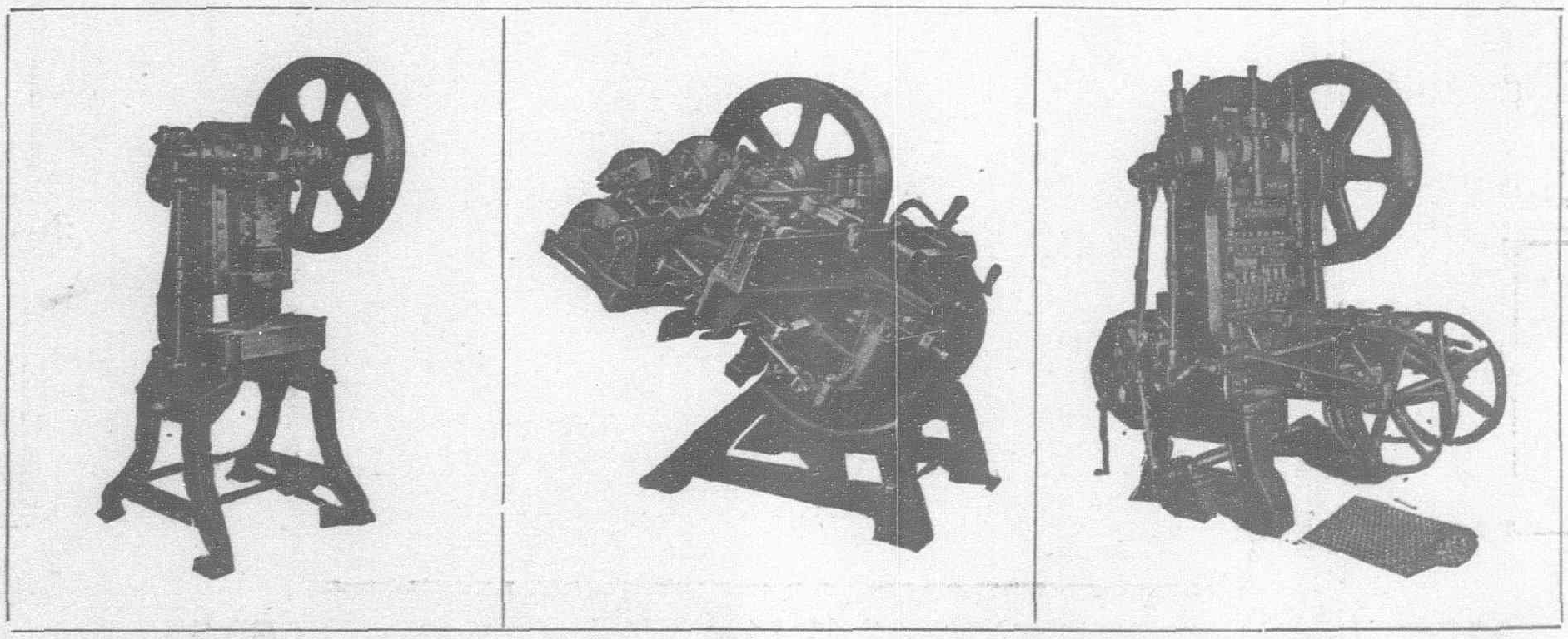

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The Far Eastern Review

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VOL. XXI SHANGHAI, AUGUST, 1925 No. 8

MAY 30

A FULL JUDGEMENT on the events of May 30 and the widespread popular antagonism to foreigners is not altogether possible even three months after the event. Until a judicial inquiry has definitely established responsibility and has determined the cause of the rioting and subsequent shooting, it is only a mark of partizanship to blame one side or the other. That such an inquiry has not been held is an error of judgement on the part of the officials in Peking, both Chinese and foreign. The Shanghai Consular Body and the Shanghai Municipal Council both declared for such an inquiry within a few days after the trouble started, and only the interference of the diplomats in Peking prevented what would undoubtedly have been a palliative from taking place.

Two immediate causes of the general anti-foreign movement was the strike in the Japanese cotton mills in Shanghai and the anti-foreign ultra-nationalistic propaganda conducted by the Soviet Russian representatives in Shanghai.

Japanese Pre-Eminence

Japanese capital dominates the textile industry of China. According to figures issued by the *Government Bureau of Economic Information*, the following was the ownership of cotton mills at the beginning of 1924:

	Chinese	British	Japanese
No. of Mills	73	5	41
Spindles	2,112,154	250,516	1,215,544
Looms	13,689	2,863	5,925

In 1922 there were 64 Chinese-owned mills in China; in 1923 this number was decreased to 54. It is reasonable to assume that the ten mills have passed to Japanese ownership. One British-owned mill in Shanghai passed to Japanese ownership in 1924-5. In Shanghai the Japanese now own 33 mills, representing an investment of more than Y.200,000,000.

From the above figures it will easily be seen that the Japanese influence in the textile industry is pre-eminent, and that a stoppage of work in those mills means a period of inactivity for the whole industry. The strike, then, which broke out in the Shanghai Japanese mills during the Spring crippled the industry, causing damage to Chinese and foreigners alike. In the course of the strike Russian agitators and Chinese Bolsheviks from Shanghai University intimidated the workers and conducted a propaganda which was not to be a class struggle between Capital and Labor, but a national struggle between Chinese and Japanese. This had nothing at all to do with the strike. This was not at all the opinion of the workers. It was an extra issue created by the agitators and fomented in the hope of prolonging the strike and spreading it to other industries. *The Chinese people are not anti-Japanese. They are not anti-foreign. Whenever such an issue is invoked in China it is the result of outside interference, of outside forces seeking to utilize the Chinese people as tools in a selfish game of international politics.* Russia utilized the strike in Japanese mills to foment an anti-Japanese movement in China. Russia sought an opportunity to conduct her own propaganda among the Chinese laborers and found it.

THE FAR EASTERN REVIEW has always sympathized with China's nationalistic aspirations. We always realized that the day will come when the Chinese people will organize a firm Government, will stabilize internal conditions, will devote their energies to public services, such as the development of means of communication and of great industries. We have held that when that day comes China will ask that the treaties which are now so objectionable be rewritten, and that China will then be able to take her place as an equal among the nations of the world. We have viewed with regret the carelessness, the negligence, the selfishness of China's militarists, who have permitted the country to suffer disunion and indignity that their own private fortunes might be increased.

Russian Intrigue

It is not, therefore, because we do not favor nationalism in China that we connect the present movement with Russian propaganda, but it is because we regard ourselves as friends of China that we view with the deepest regret the misfortune of a great nation on the eve of a diplomatic victory suffering herself to become a tool of Russia, which seeks to utilize the annoyance of the weak and small among the nations to embarrass the great and important Powers.

What was China's position on May 30?

China had won a signal victory at the Washington Conference. Her position of inequality was recognized and a definite promise of redress was made. China was without enemies. Great Britain, the United States and Japan had adopted policies which were favorable to China and which, in many respects, were more satisfactory than China could have anticipated at the time of the Versailles Conference. These favorable policies were possible because the United States and Great Britain were acting together with Japan, so that these three nations were almost a unit in their attitude of helpfulness toward China. France alone prevented the fulfilment of the terms of the Washington Agreements by failing to ratify the treaties because of the gold franc question. Had Great Britain, the United States and Japan not been hampered by France's unwillingness to ratify the Washington Treaties, a Tariff Conference would by this time have been held in Peking, and China's international situation would have been improved, in spite of the fact that almost never in her history has the Government been so impotent or internal conditions so disturbed.

Even without the holding of the Tariff Conference, China's position *vis-a-vis* the nations registered an improvement. For Japan was doing everything possible to win the friendship of the Chinese people, and no European nation was aggressive. The general viewpoint seemed to be to allow China to work out her own salvation and to help her along if possible. Russia, the policy of which since 1919 has been to establish a series of buffer states between herself and the Powers, was displeased with the recurrence of relationships of friendship between China and Japan and between China and the Western Powers. Russia's buffer state policy had produced curious results in China, for in one place, such as Mongolia, the Russians are bitterly anti-Chinese, while in Peking they attempt to appear to be exceedingly pro-Chinese and on good terms with the Central Government, and in Canton the Red Government is bitterly anti-Peking and is working for separatism in China.

The Shanghai Bund—The Heart of Economic China

It is remarkable that Russia, which had already destroyed China's position in Mongolia by fomenting an anti-Chinese nationalistic movement there, which has been stirring up an anti-Chinese nationalistic movement among the Mohammedans of Sinkiang and Kansu, and which has attempted to revive the spheres of influence in Manchuria, became interested in nationalism in China. Therein lay the greatest danger to a genuine nationalistic movement in China. For anything smeared with Russian gold, anything mellowed by Russian approval becomes so odious to the rest of the world, as no matter how righteous the movement, its connection with Russia makes it a menace and a danger to the peace of nations.

The Unequal Treaties

Russia utilized the natural and known annoyance of the Chinese with the "unequal treaties," a poor and un-Chinese term for the unilateral treaties which were signed under the Manchu *régime* as a result of wars in which China was the loser, just as other nations in other parts of the world have been forced to sign humiliating treaties when they lost a war or were unable to defend their integrity. The Russians utilized the quarrel among the provinces in China and assisted the Canton Government, which naturally made for further disorders in the land. The Russians financed agitational organizations through the Red University at Irkutsk, and later at Whampoa, near Canton, to create disorders in China. The plan was simple: It was that when Chinese "cells" of the Communistic movement rose against either the Chinese Government or against foreigners in China the confusion and disorder already existent in the country would make resistance difficult, if not impossible. In the full realization of their plan the Russians have been unsuccessful, for the natural sobriety of the Chinese people made outrages, as visualized by a Russian when he thinks of revolution, impossible.

Russia's influence is under-estimated by well-meaning, ardent Chinese nationalists, who believe that the foreigners are utilizing the general dislike and distrust of the Bolshevik to ridicule and minimize a Chinese nationalist movement. Their error lies in the lack of an international viewpoint on the part of the Chinese nationalists. They have failed to grasp the significance of the Third Internationale and its methods of work. They have not watched the course of events in Europe between 1919 and 1923, when Russia fomented similar movements in every European country, only to fail. When the world revolution, which is a religious ideal with a Communist, failed in Europe, the Soviet Government concentrated on Asia. Efforts were made in every Asiatic country to establish a point of contact, a "cell," as the Bolsheviks call it. In Afghanistan, Turkestan, Mongolia, China, Korea and Japan, the Russians labored, everywhere adapting their propaganda to the local situation. In one place they were nationalistic, in another aggressive. In China, for instance, they attacked British and Japanese imperialism, and yet reasserted Russian imperialism in Manchuria. On the whole, the Russian effort in Asia met the same response as in Europe. The peasantry of Asiatic countries had no desire to leave their century-old ideals and principles for the uncertainties of a Bolshevik millenium. Only in Canton did the Bolsheviks gain a foothold, and there it was the result of a curious series of episodes.

The Bolshevik agent attached to the Kuomintang, Mr. Borodin, was the only Russian representative in China who really succeeded in his effort to gain control of a Chinese unit, largely because he was able to finance the Red Kuomintang Government in Canton, and because he was in a position to provide arms, munitions and Russian commanders. He established a military school at Whampoa, near Canton, where Russians drilled Chinese, mostly not Cantonese, in accordance with the Soviet drill books. He made it impossible for any opposing Chinese general to defeat the Red Army. He became the guide and paymaster of the Red Kuomintang, the controller of its political and military activities. Only, however, where the Red Kuomintang's influence extended, could Mr. Borodin be of service to Soviet Russia in China. Elsewhere he was unknown, and as the Chinese people more and more came to know of the destruction of trade, the poverty of the peasantry of Kwangtung, the richest of provinces, they cursed the man and the government which foisted him upon China. The White Kuomintang hold him in contempt, but for the Chinese tools of Comrade Borodin, for Liao Chung-kai and Wang Ching-wei they retain a bitterness and hatred which is bound to express itself in still further bloodshed before long.* It is an amazing fact that wherever the White Kuomintang is most influential, particularly in the Upper Yangtze Valley, the disturbances have been fewer and of a less ferocious character.

The question often arises, What does Russia want? In the course of the Soviet's effort to impose Bolshevik principles upon other nations and to extend the imperialistic sway of Russia in Europe and Asia, there have been three impediments, Great Britain, the United States and Japan. The Allied support of the Czechs in 1920 ended in a Soviet victory because the Allies withdrew, eventually forced Japan to withdraw from Siberia, and left the way open for the Bolsheviks, first through the Far Eastern Republic and now through official Soviet agencies, to conduct their anti-British, anti-Japanese, anti-American campaign in China. Elsewhere, on the whole, the Soviet Government has not succeeded, and even in China it is but a seeming success, for the Bolsheviks know that on the whole the Chinese people find more value in the practical friendship of the three Great Powers than in the lip service of Russia.

At first the Russian idea was simply to create disorders in China with a view to imperilling the capital investments of Britishers, Americans and Japanese in this country. Labor troubles and disorders always reduce profits and discourage further investment of capital. Furthermore, in a period of constant disorder the people become discontented and nervous, and can then be utilized for the fomenting of still more trouble. The mass resistance is low. On the other hand, the three great Powers were interested only in constructive enterprises, from which they gained a certain kudos. New enterprises, new schools, cultural and industrial development plans serve to cement the friendship between China and the three great Powers which alone can serve in this direction. The Soviets then hit upon the scheme of utilizing Chinese nationalism in such a manner that the Chinese would reject the contributions of friendship. The students particularly were made to feel that these contributions of friendship were masked capitalistic bribes to keep them in permanent servility to the so-called Imperialistic Powers. Such an argument quite naturally appealed to the younger Chinese, who had already pledged themselves to tariff autonomy and the abolition of extraterritoriality. The aims of young China and the promptings of Bolshevik Russia dove-tailed, so that in China Mr. Karakhan apparently was successful in creating a bond of friendship between Soviet Russia and China. But Mr. Karakhan does not know, and his Government does not know, how the Chinese will react to Russia's imperialistic program—for Russia now wants something more positive in China than the mere weakening of British, American and Japanese influence. *Russia wants to utilize China to achieve Russian equality with the Powers. Russia wants to fight Japan on Chinese soil, to use Chinese soldiers and China's resources in such a war, to establish a Government in Peking managed and controlled by Russian Bolsheviks who will direct China's efforts in this war. Russia wants China to be a tool in her own war of revenge for the defeat in 1905, for the humiliation of the White Bear.* Russia believes that China will be foolish enough to agree to such a program; but it is safe to predict that when that day comes the nationalistic spirit of China, the consciousness of race, the good common sense of the Chinese people, the tradition of history will turn the wrath of China on the intriguers and betrayers, on Soviet Russia. Soviet Russia will reap in China what she has sown here—bitterness, hatred, disappointment.

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*Liao Chung-kai was assassinated after this article was written.

Manchuria—A Survey

THE position of Manchuria within the Republic of China is seldom understood by those who believe that China is a unified, centralized country. Manchuria and Mongolia, outside the Great Wall, are altogether apart from China proper, in that they are sparsely populated and are peopled in part by alien races. Both Manchuria and Mongolia conquered and held China at one time, only to be absorbed by the Chinese people, not by conquest but by the assimilative genius of the Chinese. The Mongols, as a race, are decadent; but sufficiently active to be a problem to the Peking Government. The Manchus are moribund and are no longer a factor, but the Chinese in Manchuria are politically very active and competent, and under Marshal Chang Tso-lin are maintaining an administrative independence of Peking which seriously affects the status of the Peking Government, particularly as Manchuria's sway within China Proper extends from the Great Wall to the city of Shanghai.

In spite of the sparsity of population, Manchuria is undoubtedly the richest section of China. Consisting of the provinces of Fengtien, Kirin and Heilungkiang, it serves as a granary, producing beans, wheat and kaoliang in huge quantities, so that, for instance, Dairen, the port of South Manchuria, is the center of the soya bean trade of the world. The largest industrial enterprises in China, the only producing steel plants, are in Manchuria, which is now also developing a textile and large scale flour milling industry.

Much of Manchuria's progress is due to the progressive efforts of the South Manchuria Railway, the largest industrial organization in the Japanese Empire. Manchuria and the South Manchuria Railway have become so closely bound together by economic ties that it would be impossible to destroy the prosperity and integrity of one without altogether dislocating the other. It is fatuous for chauvinistic Chinese or anti-Japanese foreigners to attempt to under-estimate this relationship, for the realities of Manchuria are against them. The constructively-minded Chinese have never questioned the value of the South Manchuria Railway to China, for they have witnessed the transformation of a part of their country from an unproductive, poverty-stricken, backward area to a hive of industry, to a progressive center from which radiates commerce and wealth, bringing riches and importance to the whole country.

The Chinese have grown wealthy on the activities of the South Manchuria Railway, and in Manchuria, where the value of Japanese assistance has been most appreciated, there is no anti-Japanese movement, no boycotts, no strikes. The Chinese and Japanese there work together in harmony and friendship.

Russia Enters

Into this scene entered Russia—Soviet Russia, the disrupter of nations. During the old days of imperialism, after Portsmouth, Japan and Russia reached an agreement delineating their sphere of influence in Manchuria. An arbitrary line was drawn, south of which the Japanese regarded as their sphere, and north of which Russia regarded as her sphere. Japan owned the South Manchuria Railway, and Russia, in effect, owned the Chinese Eastern Railway. The Great War, however, wrought its changes. Russia, for a time, ceased to be a factor in China's affairs. China herself took over the management of the Chinese Eastern Railway under the capable administrator, Dr. C. C. Wang. Japan, in the meantime, had joined the Consortium and had attended the Washington Conference, and had given up all her claims to spheres of influence in China. Japan pooled her unworked interests in China with the other nations on the basis of the general interest of China.

Soviet Russia, which attacks imperialism in others but practices it herself, returned to the management of the Chinese Eastern Railway on an agreement with China which has never been kept either in spirit or letter. As soon as that was accomplished, Soviet Russia reasserted the sphere of influence in North Manchuria and sought to obtain recognition of this by both China and Japan. Thus far neither nation has replied to Russia's efforts, which are in the form of protests against the building of the Taonan-Tsitsihar Railway by the Chinese Government. It so happens that the Construction Department of the South Manchuria Railway has been awarded the contract to build the road by the Chinese Government, but this is merely a construction contract and has no political significance. The South Manchuria Railway is probably the only company in Manchuria equipped to undertake this work. Russia, however, protests, and seeks to make out a case so that peace between Russia and Japan depends upon the revivification of these spheres of influence. Russia is seeking for trouble with Japan in such a form that Japan will appear to be the aggressor.

What South Manchuria means to Japan, and the significance of the Russian attitude in international relations, forms an interesting preface to Mr. Adachi Kinnosuke's new book, "Manchuria—A Survey." We reproduce this preface in full because it is so clear a statement of the situation, and because it represents the point of view of so many Japanese who are thinking of the future of their country. Mr. Adachi knows his Manchuria and China; he knows his America. When Japanese of the calibre of Mr. Adachi and Count Soyeshima openly point to the inevitability of war between Russia and Japan, the nations of the world might well turn their eyes toward Manchuria.

Adachi's Preface

Mr. Adachi's preface follows:

This is a story of what Manchuria has and what she is making of it,—a story of her crops, her mines and of her forest wealth.

It is also a story of what all these mean to Nippon.

It is not an Economic History of Manchuria: it tries to have as little as possible to do with a mere record of dead facts. The book's aspirations are rather immodest, in fact—even heroic. It addresses itself to the task of stopping America to see Manchuria as she is—a big enough job even for the prophet who once commanded the sun to stand still.

With the general run of our American readers, Manchuria is a name pasted on that jumping-off edge of the world somewhere in the outer darkness of their school geography—a mere label, some 10,000 miles below their mental horizon. Knowing that, and without apology, without ceremony, this book essays to make Manchuria as intimate to our American friends as a Philadelphia-made locomotive or Milwaukee steam shovels, which, indeed, happen to be writing the present-day history of Manchurian industry out here.

Funshun and Anshan are quite as American as Pittsburgh or a coal-field of Illinois in their methods and mechanical equipments. This is quite as true as that a few steps from these coal mines and steel plants one will find the Chou Dynasty (born 1122 B.C.) a reality, alive and kicking. For in Manchuria the Twentieth Century walks arm in arm with the days of Noah. Along the side of the Through Express of the South Manchuria Railway—made up of the same American Pullman sleepers as the "Broadway Limited"—creaks a wheelbarrow which has not lost a single one of the classic lines, old when Confucius was a baby. All of which means that Industrial Manchuria is, this very day, clearing in a single jump more than two thousand years. It is a huge industrial laboratory in which the old and the new, the Oriental and the Occidental, experiences and experiments are being tested out in a feverish rush. It is not a melting-pot of races, but a crucible of economic theories.

There is another thing of interest about Manchuria:

The question of WAR or PEACE for Japan will be settled—not in Japan nor on the Pacific, as some of the navy people on both shores of that ocean dearly love to believe. But in Manchuria. The question of FOOD for Japan is being settled there to a considerable extent. And the question of FOOD is one of the aliases of the question of WAR or PEACE. This must be of some interest to the people of America, where every time money is needed for a warship the propagandists feel it a moral duty to drag forth the over-worked ghost of a Japanese menace.

In the past Japan has known Manchuria as a battlefield. She has fought over it twice—against China in 1894 and against Russia in 1904. She is about to find there the source of life and of national peace. For of all the thousand troubles Japan has, two are serious: the lack of FOOD and the lack of vital raw materials, such as iron and oil. And Manchuria seems to be the answer,—to a large extent.

Then there is still another thing:

Last year in my wanderings up and down the Homeland of the Sun I saw that the only path of salvation for our dearly-beloved Nippon lay through the industrialization of the country. Over every section of the Island Empire I saw industrialization going on feverishly, aggressively. It was no easy job all the same: every inch of the old country is encrusted with the vested interests of centuries. In Manchuria, building over the wreck of the Russian Dream, all is different. It affords an experimental ground for the Japanese which is hard to beat. At Dairen the Japanese have built a port and a city more modern, more sanitary, with better-built houses and better-paved streets than anything they have at home. In Manchuria, not in Japan, the Japanese brought into existence the South Manchuria Railway Company, absolutely the biggest Japanese company ever organized.

It should not surprise anyone to hear that the future captains of Japanese industries are coming out of Manchuria.

Red Journalism

ONE of the most remarkable feats in journalism is the reporting of Shanghai events and conditions by a reporter who remains in Kobe, Japan. From the standpoint of a visual knowledge of conditions in China, Kobe is as far as London. From the standpoint of atmosphere one might as well be in New York as in Kobe to understand China. The critics of J. O. P. Bland, for instance, complain of him that he does not know the current tendencies in China because he is away from the country too long. The same is just as true of a writer in Kobe. Yet, Mr. John A. Brailsford, Kobe correspondent of the London *Daily Herald* whose articles occasionally appear in the *New York City World*, undertakes to describe conditions in China and to write with the air of an expert and an authority on all subjects related to China.

The article in the *New York City World*, for instance, is an example of the sort of dangerous piffle this man sends abroad to convince his own countrymen and Americans that their nationals and his are brazen, hard-hearted devils. The article is headed: "Why China is Boiling Mad at the 'Foreign Devils.'" The subhead is "Westerners Too Quickly Acquire the Bullying Habit—Justice is of Two Kinds, One for Foreigners, One for Natives." The article then proceeds to belabor the foreigners in China as though they were all pre-natal criminals. Mr. Brailsford gives two examples of the misdeeds of the foreigners in China, on both of which he is misinformed, and therefore with regard to which he gives an altogether false impression.

His first instance is as follows:—

> A few months ago a Chinese soldier, disarmed, was killed by an American marine at Shanghai. The victim was one of about 10,000 troops who, having been defeated in the civil war, had taken refuge in Shanghai and had been interned by the foreign authorities there. They were forbidden to leave the internment camp, though it was admitted that the conditions in the camp were vile in the extreme. Four Chinese were seen trying to escape. The American marine on guard fired and killed one.

The writer of this article personally investigated this particular instance on behalf of a daily newspaper in Shanghai immediately after it happened. The facts are as follows:

During the Kiangsu-Chekiang war a body of soldiers under General Chang Yuen-ming rebelled and held their headquarters against their commander, Marshal Chi Hsieh-yuan. This war endangered the whole of Shanghai and aroused the bitter opposition of Chinese and foreigners. In the course of the fighting these soldiers were defeated. They took refuge in the French and International Settlements and became a serious menace to the peace and health of Chinese and foreigners alike. A riding school was improvised into a detention camp, where they were provided with beds and food—far superior to anything they had in camp. It was in March, when Shanghai suffers from heavy rains, and the men were in a riding school with a dirt floor. Before they were given the riding school they were huddled together in the open air, not in the foreign settlements but in Chinese territory on the edge of a foul creek.

The real menace to the city was that some of the soldiers would break loose and loot the city. Landing parties were sent ashore to protect the city against this danger. In the course of the trouble some soldiers attempted to escape, and one was shot by an American marine in the course of his duty. Consul-General Cunningham rushed to the spot and made an immediate investigation. Newspapermen also went to the spot. *It was the concensus of opinion on the spot that if the marine had not fired an attempt would have been made to break for liberty and to loot the city.*

The above is an eye-witness's account. Compare it with Mr. Brailsford's Kobe account in the *New York City World.*

Running Amok

In the same article Mr. Brailsford picks on a motor car accident and gives the impression that foreigners can run down Chinese and kill them with impunity. Now, any one who understands the operations of the Foreign Courts in China knows that they are much stricter in their administration than the Chinese courts. In the British Supreme Court in Shanghai and in the United States Court for China men have been very severely punished for motor-car accidents. One American in Shanghai has for years been paying a part of his monthly salary to the family of an injured person. The records of both these courts will bear scrutiny with regard to their conduct on this subject; yet Mr. Brailsford is willing to sign his name to an article, and the *New York World* is willing to publish an article, which gives an altogether unjust impression of conditions here.

In a decision rendered on July 2, 1916 by Judge Lobingier of the United States Court for China in an accident case he said:

> "The rights of pedestrians on public streets are equal to those of motorists and the latter must be on the lookout for the former. In this case while defendant says that he did not see plaintiff till just before the collision the policeman and the Chinese tailor had seen her while she was crossing the street. Plaintiff's credibility was questioned in argument but the main facts above reviewed do not depend on her testimony; they are established by other witnesses, and chiefly those called by defendant.
>
> In the Federal Courts the burden rests upon a defendant to prove contributory negligence on the part of plaintiff and we do not think that burden has been met in the case at bar."

This policy has always been followed by the court.

If a Chinese comes before the Mixed Court, he will be fined $50 or $100 according to what he could pay. In the foreign courts, the damages often run into thousands of dollars.

Hits at Japan

In the *London Daily Herald* Mr. Brailsford published an article on "Japan's Political Safety Valve: New Manhood Suffrage Act Covers System of Repression." Again Mr. Brailsford picks on a few facts to cover an attack on the Japanese Government. We quote:

> Radicals are thrown into prison without trial, subjected to the attentions of detectives who seek to induce them to implicate themselves, and others are brought to trial after months, or even years. In the present trial of Communists the Court refused to permit the defendants to call witnesses.
>
> However, it appears that the rulers of the land are gradually coming to realize the necessity for a safety-valve for the pressure of popular discontent.

The development of universal manhood suffrage has been a slow process in all countries. The revolutions of 1830 and 1848 in Europe, the Chartist Movement in England, and the various Reform Bills in England covered more than a century. One might almost say that the struggle for universal suffrage in Anglo-Saxon countries began at Magna Charta and lasted until the Great War, a matter of some seven centuries. In Japan the process has been of much shorter duration. It is little more that half a century since Japan has changed from a feudal state with an absolute to a constitutional monarchy. The process of evolution of the masses from one political system to another has been gradual, but speedy. Japan has had the advantage of western example and has not been required to go through all the testing stages of the Industrial and Social Revolutions of Europe. Yet human nature and the attitude of individuals *vis-a-vis* ancient institutions is more lasting than paper constitutions. *The reformers of Japan had not only to change the economic and political technique of the Japanese, but their habits and viewpoint.* This process has taken less than two generations. Some of the original reformers are still alive. Some of them are still active in the nation's affairs. They all knew that the only effective method of fundamentally changing the political viewpoint of the masses could be by popular education, which is a slow process in any country. Even Mr. Brailsford, who seems to be willing to live in a country he dislikes when the world is so large and broad that he can surely find a more congenial place, will have to admit that few countries can vie with Japan in the literacy of the people. The fruits of this work are just beginning to become evident, and universal manhood suffrage is immediately granted. What more could even a radical like Mr. Brailsford require?

Child Slaves

Again, in the *London Daily Herald* Mr. Brailsford (his name is not given, but "From Our Own Correspondent, Kobe, Japan" fixes the responsibility) publishes an article on "No Relief for Chinese Child Slaves." He says:

> A hideous outrage on child life is being perpetrated in the mills of Shanghai. Not only is there a moral responsibility on the Westerners who control the situation to put an end to the abuse. As long as it lasts, its rebound will be felt. You can't degrade other people without degrading yourself. You can't degrade other people's children but the influence will come back through unseen ways upon your own.

Now, it is a fact that the Westerners worked very hard to have the Child Labor Amendment passed. *The Chinese opposed its passage* on the ground that the Chinese Government had legislated on the subject and that the Municipal Council need pass no further legislation. The British Consul-General at the time devoted much of his energy to the passage of the Amendment. Mrs. Gull, the wife of the secretary of the British Chamber of Commerce, devoted herself to it. Mr. Brooke-Smith, the manager of Jardine's, delivered an address favoring the amendment and asked ratepayers to vote for it. All the foreign newspapers favored it. A special meeting was called to pass the amendment; then the event of May 30 intervened and spoiled this effort. On the morning of the strike big posters were placed throughout the city asking the ratepayers not to attend the meeting. These posters were put up by Chinese.

Now, as a matter of fact, the bulk of the factories are Chinese-owned. In Shanghai the British own five out of more than thirty cotton mills. The Chinese did not want the Child Labor Amendment because they were not ready for it. It will perhaps interest Mr. Brailsford to know that in the Nagai Wata Kaisha Cotton Mills (Japanese) and in the British-American Tobacco Company factories (British) the employers have worked out a system of measuring their workers in an effort to keep children out, the only method available, as there is no Government registration of births in China. With regard to the whole question of Child Labor, we quote from the *China Year Book* (1925):—

> "The problem of female and child labour in China is different from that of western countries. The earnings of the head of a family in China, either among farmers or artisans, are so small that it is necessary for the welfare of the family that all the members of it contribute some earnings as soon as possible. The average earning of adults throughout the country is inadequately known, no scientific survey ever having been made, but casual experience indicates that it is a correct statement of the condition to say that the earnings of the female and child members of the family are necessary for the maintenance of a bare living. Under the handicraft system, still largely in vogue throughout China, female and child labour went over to the factories from the handicraft system. On the farm, children work as soon as possible, the small boy taking care of the water-buffalo being a common sight in South China, while the child carrier is usual in North China.
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> "As long, then, as wages are insufficient to provide for the care of a family, the adult head of the family has to permit his female members and children to work. All efforts at regulation of child labor thus far have met with more opposition from the laborers themselves than from the employers."

Mr. Brailsford's articles have been taken up in this way because it is necessary occasionally to call attention to the sort of stuff that is sent out from the Far East by radical correspondents. The Chinese never ask for these sort of articles. They are basing their case not upon statements which can easily be disproved, but upon a claim for justice. Why do Mr. Brailsford and similarly-minded persons embarrass their case?

Strikes Economic, Then Political, Now Economic Again

By George E. Sokolsky

An Article by the Editor of "The Far Eastern Review" in the "North China Daily News"

THE present phase of the strike was perhaps not altogether unexpected. It might be called the third phase of a general uprising of labor in Shanghai. The first phase was purely economic and was evidenced by the strikes in the Japanese cotton mills in Shanghai and Tsingtao. These strikes ushered in the end of 1924 and culminated in the riots of May 30, when the second phase of the movement made its appearance. This phase was largely political: an anti-British, anti-Japanese movement developed even among those who were not laborers. The leadership for a moment passed from labor groups to students and merchants. Without discussing any of the political questions of that phase, it is necessary to indicate that there were many factors other than economic which swelled the ranks of the strikers and which agitated all classes of the Chinese people. The third phase is again economic. It is a movement for the increase of wages and a betterment of conditions. It knows no nationality, and, as a matter of fact, is liable to attack Chinese rather than foreign institutions, in that conditions and wages are not as good in the former as in the latter.

The Post Office Demands

The Post Office strike was entirely economic. The strikers' demands looked like political propaganda, but these demands have more or less become stereotyped, each striking group copying what has appeared before. The actual demands were for wage increases, and the strike ended the moment the increase was assured. Had all the political demands been granted and the wages not increased, the strike would not have ended. That test will apply to all economic strikes, no matter what the ultimatum of the strikers says about foreigners and the treaties. After all, in this phase of the strike movement the workers have practically forgotten the wild urgings of the Chinese Bolsheviks and have again returned to what is becoming a purely economic struggle in an industrial centre, a struggle which is not different from similar movements in England and America and which seems to be an historical concomitant of the application of the method of the Industrial Revolution to production and distribution.

To the Chinese laborer good working conditions are apparently not as important as wage increases. This is understandable to the economist, although it must appear as ingratitude to such employers of labor as have provided their workers with modern social improvements. The three firms which have the most modern programme of social improvements are the Naigai Wata Kaisha Cotton Mills, the British-American Tobacco Company plants, and the Commercial Press. The present writer is not repeating company propaganda, but as editor of the chapter on labor for the "China Year Book," he each year makes an investigation of the whole field, and therefore is in a position to justify such a statement by continuous observation. These organizations provide benefits to their workers in the form of education, health protection, better wages within the particular field and a supervisory interest in the general welfare of their workers, which contrast favorably with similar efforts abroad. In the case of the B.A.T., wages are practically on a sliding scale, in that a rice allowance is provided which is in direct ratio to the cost of rice on the open market.

The Currency Evil

The difficulty with wages is that currency is uncertain in China. The currency of the laborer is the copper, which is constantly of a decreasing purchasing power. The ratio between the copper and the silver dollar, which itself is of uncertain purchasing power, is constantly fluctuating. The writer recently saw tables of copper fluctuation during the past two years covering important cities throughout the country, which clearly indicated that the copper is gradually reaching a position where its purchasing value for commodities not indigenous to the locality will be *nil*. The laborer may be paid in silver, but he converts his silver into coppers. Any surplus over his expenses has a diminished value due to the constant decreasing value of the coin. The bad money situation can in no way be improved by the employers of labor, as they cannot interfere with the authority of the Government to regulate coinage, an authority which the Chinese Government is unable to exercise.

Wages are further decreased in value by the uncertainty and excess of taxation. House-owners, who are forced to make contributions to militarists, do not take the money out of their own pockets. They quite naturally—and, from an economic standpoint, correctly—levy their additional expenditure on the tenant in the form of increased rents. It must be remembered that since August, 1924, Shanghai has been levied upon by Ho Feng-lin, Chi Hsieb-yuan, Sun Chuan-fang, Chang Yuen-ming and Chang Chung-chang. These levies or forced loans have had a tremendous bearing upon the local strike situation.

Rice Tells a Tale

The militarists have at the same time been levying excessive and illegal taxation on the agricultural districts from which Shanghai obtains its food supply. The wholesale index number for cereals, including rice, for Shanghai on the basis of 100 for February, 1913, indicates a constant rise. Beginning with August, 1924, the index numbers are as follows:

1924		December	148.1
August	144.6	1925	
September	148.1	January	147.9
October	145.6	February	145.7
November	151.8	March	152.9

—Bureau of Markets Reports.

As rice is the staple food of most of the laborers in this area, with a growing appetite for wheat foods, wages would have to move in some direct ratio with this fluctuation in price. Now, in western countries the price in staple food products such as bread or beef does not fluctuate except in periods of stress. The loaf of bread remains at the same price until some such catastrophes as a war, panic or famine brings an increase. In Shanghai, however, the cost of the staple is constantly fluctuating, so that the laborer or the employer cannot possibly know the exact purchasing value of the wage at any given moment. It is impossible to manage industry with a monthly fluctuating pay-roll, as it would be impossible to fix costs and prices under such a system; yet the laborer is bound to be dissatisfied and subject to the vilest agitation if his wages have an uncertain purchasing power. This situation, in other countries, is usually remedied by governmental action, such as the regulation of prices and distribution of food commodities, the appointment of food controllers, the distribution of doles or the punishment of profiteering. In China the Government takes no interest in the subject except to issue mandates complaining about the sufferings of the people and calling upon officials to put their minds to work on the problems, a call which is ignored as having no vital bearing upon the official's political activities.

Employer's Position Yet Worse

As difficult as is the problem of the laborer, the position of the employer is even more difficult. No employer wants strikes and labor troubles. The investment has been made in the particular industry on a basis of probable profits covering a continuous utilization of the plant and an opportunity to meet competition in a free and open market. Strikes and boycotts destroy these two conditions, and, therefore, imperial capital investments in the industry. It is not to be expected that the laborers in China will be so far-sighted as to realize the effect of their strikes upon the industries of the country. Labor in other countries has not been as far-sighted as that. The Luddites, who broke the first steam machines in Manchester, were not far-sighted. Yet men who are willing to sacrifice themselves for a national movement might be influenced to consider the effects of their activities on the industrialization and modernization of their country. For unless China becomes industrialized she will ever be the economic slave of industrial countries. The history of political freedom in Europe and Asia has indicated what might almost be a law: that those nations which are possessed of a highly developed national industry, such as Great Britain, Germany, the United States and Japan, are also possessed of the greatest political independence, while such nations as are still in a primitive industrial condition possess the minimum of political freedom and importance. Among those nations might be included the Balkans, Russia, China, the South American republics, etc.

China's Industry Infantile

Industry in China is infantile. The basis of the modern capitalist system is a firm steel and iron industry and a textile industry. China's position in the former is negligible, and in the latter is at the beginning of a career. Of the 119 textile mills in the country there are not more than half a dozen Chinese-owned and managed mills which can show a profit. This condition is due to a faulty system of capitalization and inexperienced management. The cotton boom at the end of the war brought to the country more mills than could be managed by experienced Chinese. The lack of laws governing corporation investments led to extravagances and the assumption of prerogatives on the part of managing directors which led to chaos and failure. In western countries some of the managers would have been punished for fraud; in China, perhaps rightly, the matter has been written off against experience. It is impossible to get data on how many Chinese mills are heavily mortgaged to banks or to importing firms, but current information leads to the opinion that not more than five or six Chinese-owned companies are altogether free and solvent.

In the flour milling industry the same is true. The wonderful mills at Wusih and Tsinanfu are not flourishing, although there are indications of improvement in their conditions. There is not a single Chinese tobacco company which was in what would be regarded as a flourishing condition in western countries prior to May 30. Some companies were paying dividends and pottering along, but in view of the hugeness of the tobacco industry in other countries their efforts were picayune. What their condition is now it is difficult to say, but no judgment on the condition of an industry can be based upon the extraordinary situation now in effect. The printing industry, which is everywhere important, was flourishing, but upon the basis of static conditions. Any change in wages would upset the industry, and an increase in expenditures could not possibly be accompanied by a relative increase in the selling market. By that is meant: when in Europe and America wages increase because of strikes or other conditions, the manufacturers find efficiency methods for the lowering of costs and use advertising and salesmanship for the increase of markets. In China both these methods are unavailable at present.

Costs Irreducible

1.—The costs cannot be lowered. The largest part of the goods consumed in the manufacture of commodities in China has to be imported because of the undeveloped condition of the country. Chinese cotton is of short staple, and therefore Indian, American and sometimes Egyptian cotton has to be imported. This is true in spite of the fact that cotton is now a staple agricultural product of the country. The likin tax and excessive and illegal taxes often bring the cost of the native product beyond its commercial value and make it more profitable to export it to a country having a higher standard of living, and therefore a higher cost capacity, than China,—Japan, for instance. This condition obtains in every industry, including flour milling, although China is an important wheat-growing country. As long as the basic article in the process of manufacture has to be imported, the cost will naturally depend in a large measure upon altogether extraneous influences.

In western countries costs have been lowered by speeding up the laborer. This has thus far not been successful in China, although there is divided opinion on the subject. One manufacturer said that Chinese labor is as good as any he has had in other countries; another suggested that one American negro would do as much work as five Kiangsu-Chekiang Chinese. It is clear from the state of mills and factories here that it takes a larger number of workers to produce a given article, even when machinery is the main tool, than it does in England or America. The rice-cabbage diet of the Kiangsu-Chekiang laborer is probably too poor in calories to produce a powerful worker. If, then, it takes five times as many Chinese to produce an article as it does one Englishman, theoretically the Chinese should be paid a fifth as much on the basis of the differing currencies. Theoretically that is the condition. But actually, the Chinese laborer is paid more in the differing currency.

Roads and Buying Power

2.—It is impossible to improve the market in certain manufactured commodities because of lack of communications and lack of purchasing power of the people. It may not be generally known, but every firm pushing important commodities carries certain markets at a total loss at the present time in the hope of developments in the future. These losses cannot be added to the price of the commodity elsewhere, as the market will not bear the increase because of the general standard of living, which is determined not upon industrial but agricultural incomes. The loss has to be added to the cost of production and taken out of possible profits. In many cases the cost of transportation is so high as to vitiate any possible profits. The manufacturer has then to make his profits in limited areas and on the basis of a more or less static marketing price.

Under such conditions, strikes and sudden increases in the cost of production will tend to destroy industry. Capitalists will find it more safe and more advantageous to invest their money in real estate, foreign bonds and money-lending than in industry. Any country which exists on such an economic basis is not safe, as must be evident from the condition of the franc on the money markets of the world in spite of France's victory in the Great War. Such a country lacks the economic independence to cope with Powers which are possessed of great industries. Great Britain's political pre-eminence is not based upon politics, but upon steel and textiles. Germany's marvelous recovery is not due to German soldiers, but to German manufacturing abilities. The relationship between industry and political independence is becoming constantly clearer as the aftermath of the European war focusses attention on the essential characteristics of the different nations.

Where, Indeed?

If China, then, is to develop an industry, there must be a changed attitude toward both Capital and Labor, a change which can only be developed under government supervision. But where is the Government which would take an interest, where is the Government which realizes this relationship between industry and political independence, where is the Government which would even heed the warning in such a strike as that which has at present closed the leading educational institution of the country, the Commercial Press?

Japanese Westinghouse Company

The Westinghouse Electric Company of Japan is a newly-organized subsidiary of the Westinghouse Electric International Company, incorporated under the laws of the State of Delaware with a capital of $1,000,000.

The purposes of this company are to distribute Westinghouse products throughout Japan and to arrange for proper service to the many users of Westinghouse apparatus there. Adequate stocks will be carried. The staff in Japan will be almost entirely Japanese.

The officers of the new company are Guy E. Tripp, chairman; L. A. Osborne, president; E. D. Kilburn, vice-president; I. F. Banker, managing director at Tokyo.

Banking in Japan

COLONIAL AND FOREIGN BANKING SYSTEMS; by Keith le Cheminant, B. Com. (London); George Routledge & Sons, Ltd., 1924

IN a very interesting and compact form, Mr. le Cheminant describes the banking systems of Canada, the Union of South Africa, Australia, India and Ireland, as well as the systems of France, Germany, Italy, the United States, South America and Japan.

The expansion of banking from local to national and international interests followed the general development of trade and commerce. Asiatic countries except Japan have not kept pace with this progress because of political conditions in those countries. Japan, however, when she determined upon a program of modernization did a very thorough piece of reorganization. The chapter on Banking in Japan is here given in full because of its concise and careful statement of the subject:

The Empire of Japan has often been compared to the British Isles, and they have many features in common--geographical, climatic, and economic, but in one important respect the comparison does not hold good. Japan possesses an imporant part of the mainland—Chosen, formerly Korea, and the large southern island of Taiwan, formerly Formosa. These two outside possessions have some effect on the banking institutions of the country, and each of them has a specialized institution of its own which has attained a position of some international importance.

Japan was in the fortunate position of being able to profit by other nations' mistakes in her modernizing process, and in banking she modelled her system mainly on that of England, with one or two strong points from other nations. Modern banking in Japan may be said to date from 1872, when a national bank system modelled on the National Bank system of the United States was adopted. There were a few merchant bankers of good standing already in existence in the country, notably the Mitsui Bank, which was founded as far back as the seventeenth century, but modern banking had been little developed. The adoption of the American system produced the same multiplicity of independent banks as in that country, and at the present day there are over two thousand.

It was difficulties of note issue which were mainly responsible for the adoption of the Federal Reserve system in the United States, and the note issue was found to be an equal source of trouble in Japan.

The private banks issued notes in excess, and this, with a large amount of Government paper in circulation, caused the financial structure to become severely strained, with the result that Japan turned to other countries for a solution, and found it in the adoption of a system of central banking.

The Bank of Japan

In 1883 the Bank of Japan was founded on the model of the Bank of Belgium. It received a charter from the Government for thirty years, and this was renewed in 1912.

The right of note issue was taken from the private banks and given to the new central institution, with very happy results for the financial stability of the country. The present fiduciary issue amounts to 120 million yen, but the Bank is in such a strong position that at one period in 1920 the total note issue was covered by specie, and at the end of 1921, at the height of the depression in trade, three-quarters of the issue were so covered. At the end of 1922 the position had so far recovered that only 57 million yen remained uncovered—a very strong position when it is remembered that the fiduciary issue is double that amount.

The Bank of Japan has not followed the lead of the Bank of England and separated its issue department from the purely banking department, but, apart from this, it has many of the same features. Soon after its foundation the Government handed over to the Bank the care of its balances, together with the management of the national debt. Issue and redemption of the debt together with interest payments are managed by the Bank in the same way as the Bank of England manages the English National Debt. In the last war the Bank did very good work in financing the Government's requirements, and also helped considerably in floating loans in Japan on behalf of the Allies.

The Bank of Japan naturally carries out the duty of a Central Bank in holding the balances of the "other banks," for whom it has also performs the function of re-discount. Of late years the Bank introduced the system of "acceptances," a class of business from which Japanese banks were formerly precluded, and will now rediscount bankers' acceptances made for the purpose of assisting foreign trade or home industries. The short loan and discount market in Japan has, in these circumstances, tended to develop on European lines, its operators carrying discounted bills with short loan money from banks and using the central institution for re-discount purposes if necessary. The Bank is also open to make loans to the Exchange Banks against foreign bills, a provision which has aided the work of these banks in helping to finance Japan's foreign trade. Both the Hongkong and Shanghai Banking Corporation and the Chartered Bank of India, Australia and China have branches in Japan, and one or two essentially Japanese banks dealing mainly in exchange operations are to a great extent controlled from London—although their head offices are in Japan—a fact which bears additional witness to the supremacy of London as the financial centre of the world.

Japanese banking is curious, among other things, from the fact that there are two distinct types of bank in the Empire—"ordinary banks" established under the general banking laws, and "special banks" chartered by the Government to perform special functions, and consequently enjoying certain privileges for which the Government exacts the right to appoint supervisory Boards of Directors, and so largely to control their activities. Of these "special banks" one has already been discussed, namely, the Bank of Japan, established to take over the note issue of the country and generally to perform the functions of a central bank.

Whatever may be said about the Continental system of Industrial Banking, when Japan was establishing her banking institutions the Government apparently decided that, at any rate, for a time, ordinary banking and industrial banking should be kept apart. "Special" banks were, therefore, established under close Government supervision for the assistance of trade, agriculture, and industry.

The Yokohama Specie Bank

The Yokohama Specie Bank, Limited, was founded in 1880 for the purpose of aiding the foreign trade of the country, and was given special privileges. It has since then assumed a position of world-wide importance, and its operations now approximate very closely to an "ordinary" bank, as it deals in other than purely exchange business, although its chief interests are still in financing foreign trade. The quotations of this bank fix the foreign exchange rates for Japan, and the Bank of Japan is under agreement to re-discount approved foreign bills for it to an amount not exceeding 20 million yen per annum at the rate of two per cent.—a privilege of some value.

The Yokohama Specie Bank, apart from the foregoing, is in a privileged position, in that it is entrusted with the foreign business of the Government and also holds the foreign balances of the Bank of Japan. It also has the right of note issue in China and Manchuria, but the circulation is small, amounting at the end of 1922 to six million yen, or less than one per cent. of the total liabilities. The *liaison* between the Bank of Japan and the Yokohama Specie Bank, already strong, is made additionally so by the fact that the Governor of the Bank of Japan is usually the Deputy-Governor of the Yokohama Bank, and the Deputy-Governor of the Bank of Japan the Governor of the Yokohama Bank—a provision which obviously makes for very strong interests in common.

This leading Japanese Exchange Bank has branches all over the East, in Japan, China, Manchuria, and India, and, in addition, has offices in London, Lyons, Hamburg, four in the United States, Buenos Ayres, and in Sydney, New South Wales.

Hypothec Bank of Japan

The next class of "special bank" in Japan is that which deals with agriculture and which has been extended to industrial operations. The main bank of this class is the Hypothec Bank of Japan, which was founded in 1897 as a central financial institution for assisting agricultural and industrial undertakings throughout Japan. It makes long-term loans at low interest on mortgages of real property and, in this respect, is comparable to the *Crédit Foncier* of France. The Bank has done much to develop agriculture, stock-breeding, and fisheries, and other productive activities. In connection with this Central Industrial Bank there are forty-six smaller provincial institutions which perform the same functions on a smaller scale, and locally. They advance money at low rates of interest for periods not exceeding thirty years, and, being semi-official institutions, they have usually the sole right of this type of business in their own locality.

The Hypothec Banks just described have as their main business the granting of long loans on real property. The Industrial Bank of Japan, Limited, performs the allied function of making advances on the security of bonds, debentures, and shares, mostly of an industrial nature. It also finances shipping and shipbuilding. The peculiarity of the Industrial Bank is that it is authorized to issue debentures to the extent of ten times its paid-up capital, or at present to the extent of approximately 500 million yen. The amount issued at the end of 1922 was 360 million yen, which gives room for further expansion when required.

The remaining "special banks" are those which have been established to finance the requirements of Japan's outlying possessions. The least in importance but not in interest is the Hokkaido Colonization Bank. This institution was established to assist in the exploitation and colonization of the northerly and climatically ill-favoured island of Hokkaido, and of Karafuto, the southern and Japanese portion of Saghalien. The Bank was established in 1902 and has since made considerable progress in opening up the island's fisheries and agriculture by granting long-term loans. It is authorized to issue debentures to the extent of five times its paid-up capital.

Colonial Banks

Japan has now a strong footing on the continent of Asia. Korea, the principal part of Japan's continental possessions, was transferred to the Empire in 1910 and its name changed to Chosen. In the same year the Bank of Korea, formed the year before, was established by special Act as the Bank of Chosen, and has become a semi-official central bank for the province and for the remainder of Japan's possessions and interests on the mainland. The Bank possesses the right of note issue in Chosen to a maximum of 50 million yen, fully covered by gold, with an excess issue of 20 million. This excess issue has been temporarily extended to 40 million to deal with trade difficulties in the country.

An Imperial Ordinance of 1917 proclaimed Bank of Chosen notes the sole legal tender throughout Kwangtung Province and the South Manchurian Railway Zone, where Japan has been granted a sphere of influence. These provisions have increased the prestige of the Bank, which has of late years extended its operations.

The foreign trade of the areas mentioned, with that of Chosen, is largely financed by the Bank, which arranges to buy bills against exported produce or accept bills against imports. Under the protection and influence of the Bank foreign trade has greatly increased.

Japan's southerly possession, the island of Formosa, or Taiwan as it is now called, was in a very backward condition in 1893, when Japanese rule was established. Since then great strides have been made and a considerable foreign trade has been built up, notably in the island's world monopoly of camphor.

In 1895 the Bank of Formosa, now the Bank of Taiwan, was established, and it is largely owing to its efforts that this progress has been made. The Bank acts as a central bank for the province in the same way as the Bank of Chosen does in the north, and has the right of note issue fully covered by gold with the exception of a fiduciary issue of 20 million yen uncovered by gold. Uncovered circulation in excess of this amount is subject to a tax of five per cent.

In addition to a number of branches throughout Taiwan the Bank also has branches in Japan, China, Java, Hongkong, Singapore, Bombay, London, and New York, and has risen to a place in international banking.

The ordinary banks of Japan conduct an ordinary banking business, and are subject to the general banking laws of the Empire. The Minister of Finance is in general control of their activities and can at any time order an inquiry into their financial position. In addition, they must submit a half-yearly balance sheet and report.

Private Banks

Of these "ordinary" banks the best known is probably the Mitsui Bank, which, although not incorporated as a joint stock company until 1908, can claim to be the oldest bank in the Empire. The bank in its early years was intimately connected with the famous merchant family whose name it bears and whose heads were its proprietors.

Since its incorporation the Bank has made great strides, its paid-up capital amounting to 60 million yen, and its offices numbering 16 in Japan, one in New York, and one in China. The character of the banking carried on by the company can be seen from the latest balance sheet, which shows deposits at 75 per cent. of the total liabilities, and advances, loans, and discounts at some 60 per cent. of the total assets.

The Mitsubishi Bank, Limited, was organized in it spresent form in 1919, but can trace its origin to a private bank connected with the famous merchant firm of the same name and with which was amalgamated the 119th National Bank. The Bank carries on a general deposit banking business and has extensive dealings in the foreign exchanges. There are several branches in Japan, and one in London and New York.

The Sumitomo Bank, Limited, another well-known Japanese "ordinary" bank, can also trace its descent from a private concern, having been registered in its present form as late as 1912. Considerable expansion has recently been shown by this Bank and a number of branches have been established, notably in Japan itself and abroad—in London, the United States, India, and China. Subsidiary banks have also been established in Seattle, U.S.A., and in Hawaii at Honolulu, an unusual development for a Japanese bank—which usually works not through affiliated concerns but through establishing its own branches and retaining them as such.

In conclusion it may be said that banking in Japan is on a very sound footing. During the late war Japan was able to keep its note issue always convertible into gold on demand—a fact which bears witness to the able manner in which the financial affairs of the country were conducted.

Westinghouse Forms Japan Company

Organization of the Westinghouse Electric Company of Japan, incorporated under the laws of the State of Delaware and capitalized at $1,000,000, to provide facilities for the distribution of Westinghouse products directly to Japan, has beeen announced by Mr. I. F. Baker, head of the agency in Tokyo, who becomes managing director of the new corporation.

The formation of the new company to operate exclusively in Japan is interpreted in business circles as an assurance that the Westinghouse intends to maintain permanently its independent Tokyo agency, which was established after the failure of Takata & Company. The Westinghouse Company will thus be one of the first large foreign corporations to sell its products direct on the market in Japan, rather than dealing through a Japanese or foreign agency.

The new firm has in its employ a large number of electrical engineers who were formerly on the staff of Takata Shokai, and since the suspension of the Takata agreement the Westinghouse agency in Tokyo has been regaining its full volume of trade.

The officers of the company, besides Mr. Baker, are Mr. L. A. Osborne, president; Mr. Guy E. Tripp and Mr. E. D. Kibourne, vice-president and general manager respectively. All of the stock in the Westinghouse Electric Company of Japan is owned by the Westinghouse International Electric Company.

The Problems of Professional Status

(*By a Contributor in China of "The Engineer"*)

THE newspaper mail arrived last evening and the eagerly-looked-for technical journals have been carefully studied. You must live thousands of miles away from England really to appreciate the technical journals. In remote parts of the world you can discover very little of what is happening in the way of new developments in engineering except by the good offices of these most valuable and silent friends. In England you do meet the men who are making the improvements or who have recently witnessed experiments. You often learn a great deal outside of the lecture-room when you attend a meeting of a technical society. A large number of engineers abroad miss that sort of thing very much indeed. "Books are all very well in their way," said the immortal R. L. Stevenson, "but they are a mighty bloodless substitute for life." Technical books are invaluable, especially for reference purposes, but they do not give the news. It is, of course, much nicer to discuss a problem than to read about it. The technical journals are more human than books. They are more alive. One would rather attend a meeting of a technical society than read about it, but it is a great boon to read about it instead of remaining in entire ignorance of what is taking place in the engineering world. And if we wait until all the current controversies are put into books we miss a great deal and are out of date.

The Status Problem

These are the days of democracy, and nobody is supposed to care a button about social status. That may be so in Great Britain; it certainly does not obtain in a Crown Colony. There is an official list of ranks, in which the Navy, the Army, the Civil Service and civilians figure. At any public function you are graded off according to the official list arranged by Government House. It avoids confusion, but it surprises and sometimes amuses newcomers. Every one has an official status usually dependent on his work.

There were great dicussions about the status of engineers in the Royal Navy about thirty years ago, and it is not improbable that the subject will be again revived at no very distant date. Status is, of course, a matter of social ambition. The writer has always remembered the main ideas expounded in a brilliant address given to engineering students, many years ago, by Mr. Swinburne. It was entitled "Some Difficulties in Getting On." The ambitious young men were politely told by the experienced, successful and clever Mr. Swinburne that, in nearly all cases, engineeers are hired, and it is seldom that the man on a salary makes a fortune. He is dependent for a living on his employer. In this age of democracy status does depend to no small extent on money. You can buy status by spending money—but not always; status in a profession is entirely different from social status.

The issue of *The Engineer* which has just arrived, has a leading article on this subject of "Status of Engineers." It causes the reader to arrive at rather depressing conclusions. One is that the status of engineers is not what it ought to be. The other is that the technical colleges are turning out too many engineering graduates. There is even the suggestion that "our universities and technical colleges" are persuading young men, who should seek other roads to fortune, to enter the engineering laboratories of the colleges. This is a sort of reaction against academic training, which is not unnatural. It may be that the colleges are turning out more engineering graduates than can be absorbed, or it may be that those who do not receive a training in an engineering college are able to undersell those who do spend three or four years of their lives and a good deal of money on a college training. If, however, the problem of the status of the engineer is to be worth consideration, then this college training is an important matter. For whether we like it or not, the social status of a young man is affected by the name of his school and whether he has attended a University. At any rate, those things count abroad, if not in democratic Britain. The lawyer, the doctor and the civil servant consider that a univeristy education does make a difference to a man's social status. They may be wrong, but there it is.

The Problem of China

There is another aspect of the matter which was not discussed in *The Engineer's* leader, but which is worth exploring. It is one which the writer ventures to believe is of supreme importance in China, and probably also in other countries. It is mixed up with the eternal problem of "the sinews of war." The new world politics is something that has to be reckoned with. There is a very intense national feeling in the various countries of Asia. The only people who are now likely to make possible the development of the vast natural resources of China are the Chinese. That is not to say that British engineers and manufacturing firms need no longer be interested in the matter. Far from it. They must inevitably benefit when China builds proper roads, extends her railways and uses machinery. They will co-operate with the Chinese. They will, however, be unable to do anything without the good will and even enthusiastic support of the Chinese. How, then, are we to obtain this enthusiasm for development work unless the intellectual Chinese have some knowledge of what engineering science can do in China?

Perhaps too much is made of the fact that many young men who are trained as engineers in colleges drift into some other kind of work. They have probably benefited by their training, even although they cannot produce the dividends on the time and money spent at college. It would not cause the writer any great grief if he were privileged to take part in the training of 300 Chinese engineering graduates per annum for the next ten years. These young men might find it impossible to obtain the lucrative posts that they would desire, but they would act as missionaries of applied science in China. Of course, their influence would be much greater if they were all drawn from wealthy families. And the wealthy Chinese, rightly or wrongly, are determined to send their sons to universities. It is an advantage to have some of them trained as engineers.

An example may be of some interest. Eight years ago one of the engineering graduates of the University of Hongkong left to serve under a British engineer on one of the Chinese railways. Despite the initial prejudice of his technical superiors he managed to get along quite well. After a few years he came to the conclusion that, on account of his family connections, he would make more money in official life than as an engineer on a railway. He was probably quite right. We have had many casual meetings since he became an official. He has always, in his political position, kept in mind two very important things. One is the great advantages that must come to China by the use of engineering knowledge and appliances. The other is that this Colony of Hongkong presents an object-lesson, not only of the results of applied science, but of the benefits to both nations which follow out of the co-operation between Chinese and British. Although he has not practised his profession of engineering for some years, there can be no doubt that it was a fine thing for himself and China that he was trained as an engineer.

If we could persuade the wealthy Chinese that it would pay them to introduce, let us say, roads, water supply systems, or motor omnibuses or tramcars in the cities of the interior, they would be quite keen about it. Europeans cannot hope to convince them. Only their own sons, or brothers, or nephews can do that. They may not be very practical young engineers, but they can point out the possibilities. My Chinese friend, who is a prominent official and an engineering graduate, is always urging on his colleagues to carry out this or that public work. Twelve years ago Canton, the biggest city in China, was a city without a wheel. It was worse than the London of 300 years ago, for the streets were so narrow that two sedan chairs could scarcely pass. Now the old city walls have been pulled down and there is a "bund" or water-front crowded with wheeled vehicles, as well as wide roads on the foundations of the old city wall. There are rickshaws and motor-cars in Canton to-day. Instead of shops with walls of mud bricks, there are five and six-storied buildings of reinforced concrete. Steel, electrical machinery and other products from factories in Europe or America have been used for these innovations. These changes have been brought about by young Chinese who have received a technical training in a University.

It must be remembered that the Chinese have still a very great respect for learning. The intellectual side of engineering admittedly appeals to the official classes much more naturally than does the practical work. Yet if you can only arouse their intellectual enthusiasm they will gladly take a definite interest in the workshops and machines.

It must be admitted that, so far as the acquisition of wealth is concerned, engineering is a disappointing profession for many who enter it with high hopes. There are big prizes, but there is great difficulty in the early years. For the same expenditure of energy a man at about thirty years of age probably would be better paid in some other line of life. It would be difficult, if desirable, to make engineering a closed profession, like medicine and the law. There has been, however, a definite movement in that direction. The word " Chartered " reminds us of the success which has come to those who wish to emphasize their professional status of engineers.

One great difficulty is that there are so many branches and sub-divisions of engineering. There are also so many grades in the industrial army. Moreover, engineers are usually so engrossed in their work that they have very little time to consider questions of status ; yet it is an important matter, for many engineering prospects are put forward that require sympathy and assistance from men in influential positions if they are to succeed. It may be true that during a University career a young man does not obtain the discipline or the practical experience that is so good for him. There are a good many other things that he learns. He has the opportunity, at a most malleable time of his life, to form friendships that may be very useful to him in after life.

We have the following state of affairs so far as Chinese engineers are concerned. A large number of young men, of influential families, are passing through colleges in different parts of the world with the object of studying applied science. Almost any experienced British resident in China will say that these young Chinese ought not to go abroad until they are at least twenty-three or twenty-five years of age. Therefore they should receive their academic training in applied science in the Far East. Some of those who do well at college should be encouraged to visit Great Britain in order to establish friendly and personal relations with British engineering firms. It is a fact that these young men will not go direct from school through the ordinary routine of apprenticeship in workshops in the Far East. They will not " lose face "—*i.e.*, social status—by doing the work of coolies ; after a college training they will go into the workshops.

From the Chinese working classes there are drawn men who make good mechanics. These men can find work only if the initiative in developing the nautral resources of China is taken by men of a higher social status. It is, therefore, practically certain that the rapidity of the development of the natural resources of China depends on the number of young Chinese who are attending academic instruction in technology.

It also seems to be not improbable that if the status of professional engineers all over the world is to be improved, the idea underlying the use of the word " chartered " must become general. In that case it will become the universal practice for young men with ambition to graduate at a University as the first step in a professional career as an engineer.

Mitsukoshi Department Store

The Mitsukoshi Department Store, one of the largest in Japan, has decided to build a new and modern branch store opposite the new Matsuzaka-ya Department Store on the Ginza at a cost of Y.7,500,000, according to a report printed in the Japanese papers. The site, for which a contract has been signed between Count Ito, the owner of the land, and the Mitsukoshi Company, is now occupied by Brett's Hospital Pharmacy, the Café Tiger, the Matsuda Lamp Store, and other shops. It covers a total area of 700 *tsubo*.

The decision to have a large branch store on the Ginza is considered to have been prompted by the realization by the Mituskoshi Company that the center of the shopping district, like the migration up Broadway, New York, is beginning to move up the Ginza, as seems to have been indicated by the recent construction of the Matsuzayaka and Matsuya stores. A Mitsukoshi branch in the locality is expected to be a profitable undertaking.

Construction work on the new building is expected to start early in 1928, because the leases of the present occupants of the site expire in 1927. The new building, while it will not be as large as the main store, is to be at least four floors, and is to carry as complete a stock as the parent store.

Purification of Swimming Bath Water

(From Our London Correspondent.)

An article appeared in the November issue of The Far Eastern Review on sterilization by chlorine. This has now been carried a step further, and the success achieved in sterilizing drinking water, and what may be termed semi-sterilization in preventing the growth of living organisms in the condenser tubes of steam boilers, has induced tests in other directions.

Normally, these organisms are apt to form a slimy and tenacious layer, which reduces the heat transmission efficiency and lowers the vacuum obtainable for given conditions as regards temperature and volume of cooling water. The good effects of chlorine gas in such cases is now generally admitted, but it has now been put to a new use in which it is proving itself equally effective.

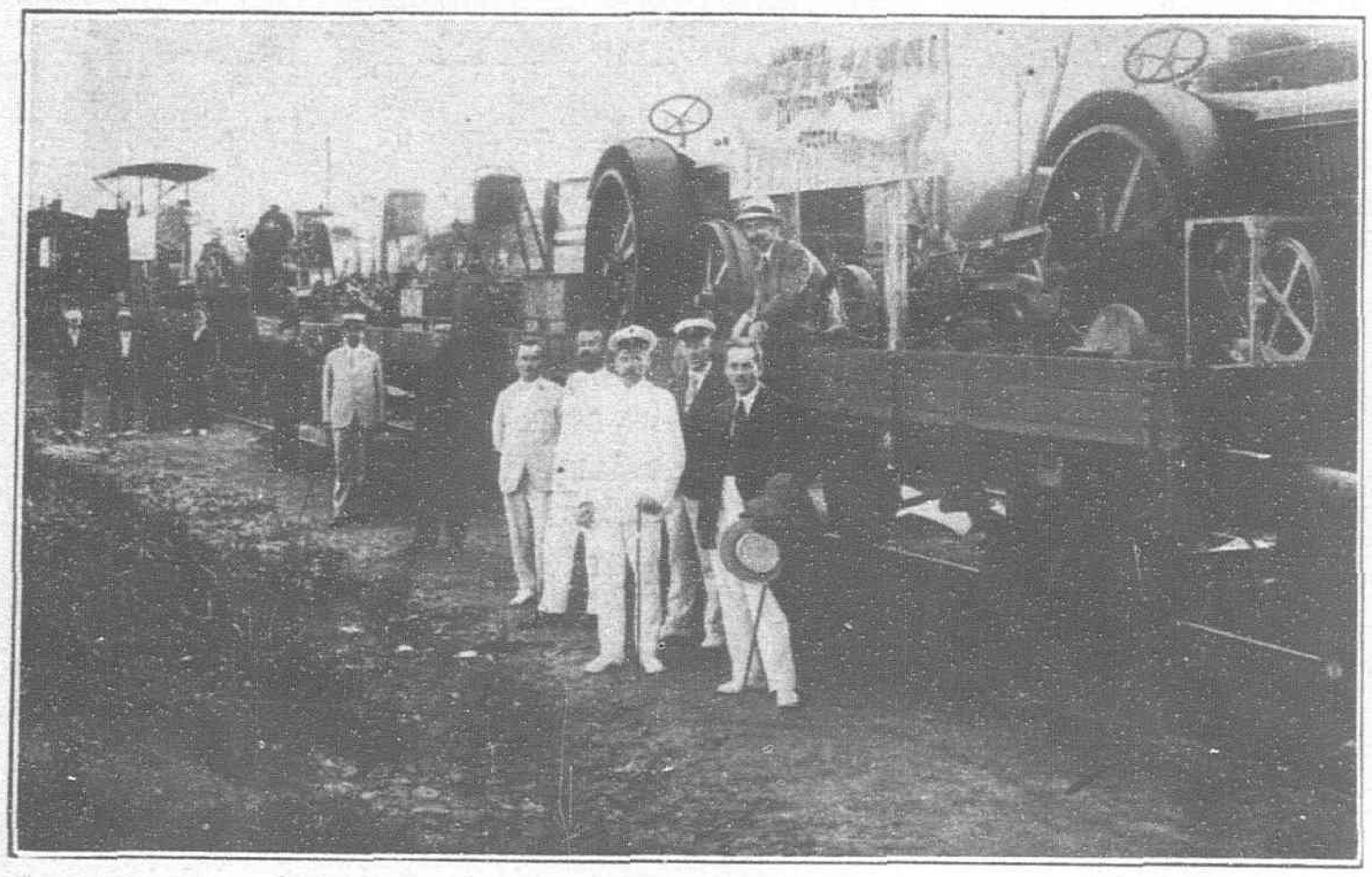
The latest and perhaps the most interesting application of the sterilizing properties of chlorine is for the purification of swimming bath water, so as to obtain a clear and sparkling water continuously for many months without emptying out the bath. As is well known, the present general method is the unscientific, unhealthy, and in many cases costly one of entirely filling the bath once or twice a week with clean water, so that the contents become dirty and discolored in a day or two, resulting in a rush of custom on " clean water days," and then very naturally a rapid falling-off in attendance.

The new method consists of circulating the bath water continuously by means of a steam or motor-driven pump, passing it through, first, a rough gauze filter, to remove any large objects, such as towels or costumes, followed by treatment with a coagulent, such as alumino-ferris, so as to separate all the coloring matter and impurities. Next, there is a passage through a pressure sand filter of efficient type, and the resulting clean water is then aerated to maintain the sparkling condition of fresh water, aeration being generally carried out by air under pressure, on the trap principle, the water being showered down through a vertical container. Finally a treatment with a measured trace of chlorine gas, about one part per 2,000,000 parts of water, follows, to destroy all obnoxious bacteria, the water being returned to the bath through a steam-heated calorifier, to maintain a constant temperature, about 72 degrees F. in the summer, and 78 degrees F. in the winter. In this way the same water may be used for at least six to twelve months, and maintained in a perfectly clean, healthy and sparkling condition, equal to fresh water, obviously a huge improvement in comparison with the present more generally accepted methods.

Under this new method the Paterson Engineering Company are using their chloronome apparatus, which uses gas in cylinders, on the same general lines as are now being applied very widely for both drinking and circulating water. The method of using chlorine itself has the advantage of being cheap, and at the same time of giving an easy and positive control of the amount of chlorine, which is adjusted in supply by merely altering a valve, and it is quite independent of the troubles inherent in the use of bleaching powder, or other hypochlorites, which are unstable, so that the chlorine content cannot be relied upon, while also adding soluble salts to the water.

A typical installation on these lines at the public baths of St. Helen's (England) is operating a men's bath of 84,000 gallons capacity (100-ft. by 30-ft.) and a woman's bath of 28,000 gallons (48-ft. by 24-ft.). The rate of circulation is equivalent to one complete replacement of the contents of the bath in ten hours, two 8-ft. pressure sand filters with compressed air cleaning mechanism being used for filtering the water from precipitated impurities. This has now been in operation six months without changing the water, representing the saving of several million gallons, and a detailed bacteriological examination and analysis after four months' running showed the water to be actually purer than many drinking waters in Great Britain.

In many Oriental countries where water is notoriously impure and frequently scarce the new system should prove a god-send, and it is particularly applicable for the fresh-water swimming tanks now so largely used in many of the great liners.



American Tractors Loaded on C.E.R. Flat Car for Direct Shipment to Russia

Looping the Loop on the Western Section of the Chinese Eastern Railway

A Study in Extraterritoriality

By *E. Lennox Simpson*

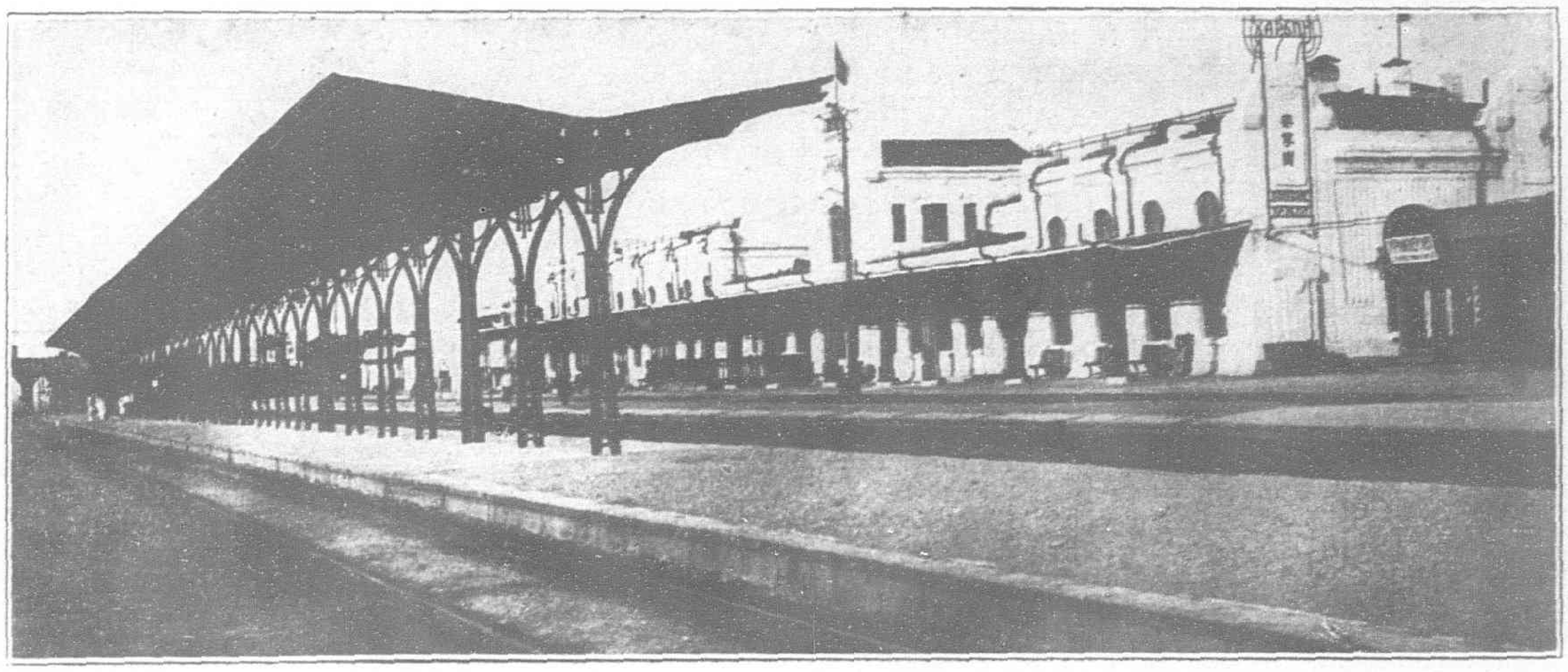
THERE was something dramatic about Boris Ostroumoff's arrest at the Chinese Eastern Railway's offices on October 3, 1924, the day the Soviet took over the management of the railway, and there is certainly something more tragic in his illegal solitary confinement in a Chinese prison for eight long months. This is undoubtedly the most important case in which foreigners are the defendants that has ever been brought before the Chinese Courts of Justice.

Ostroumoff, the selection of the Russo-Asiatic Bank, held the position of General Manager of the Chinese Eastern Railway for close on four years, whilst his co-defendants are Gondatti, ex-chief of the Chinese Eastern Railway Land Department and formerly Governor-General of the Priamur, Mihailoff, ex-chief of the Economic Department and formerly Minister of Finance at Omsk under the Koltchak Government, and Stepunin, ex-chief accountant, formerly chief bookkeeper of the Russo-Asiatic Bank.

Administration Offices of the Chinese Eastern Railway, Harbin

Before touching on other matters it is necessary first to explain about the Courts of Justice in the Special Railway Area. They are directly under the Ministry of Justice at Peking, and it is Peking who has to look after their maintenance, as with other courts of justice throughout China. Nominally they are quite independent of the local provincial government. Actually, Peking is unable to supply the funds that are needed, so that salaries are in arrears for months, and the officials badly paid, causing not only the dignity of the court to suffer, but also irregular and illegal practices on the part of the court officers, who charge imaginary fees for any little thing done for the public. It is the system and not the officials which must be blamed. In the second place, the provincial authorities have a great deal to say, insisting that the higher court official appointments be approved by them first, which means to say that these officials become morally subservient to the provincial authorities. These are two fundamental defects in the Chinese judicial system at present.

In the Ostroumoff case we find that the Investigating Judge, as soon as he was appointed to preside over the trial, obtained ten days' leave to go to Peking to see his sick mother, and never returned, no doubt shirking the responsibility. He was succeeded by a Peking judge, who never took up his post, two local judges succeeding each other but never getting further than wading partly through the nine volumes of material and documents, the case being finally turned over to the present judge. The latter is a very



Harbin Railway Station

young man, not yet thirty years of age, and therefore without much experience.

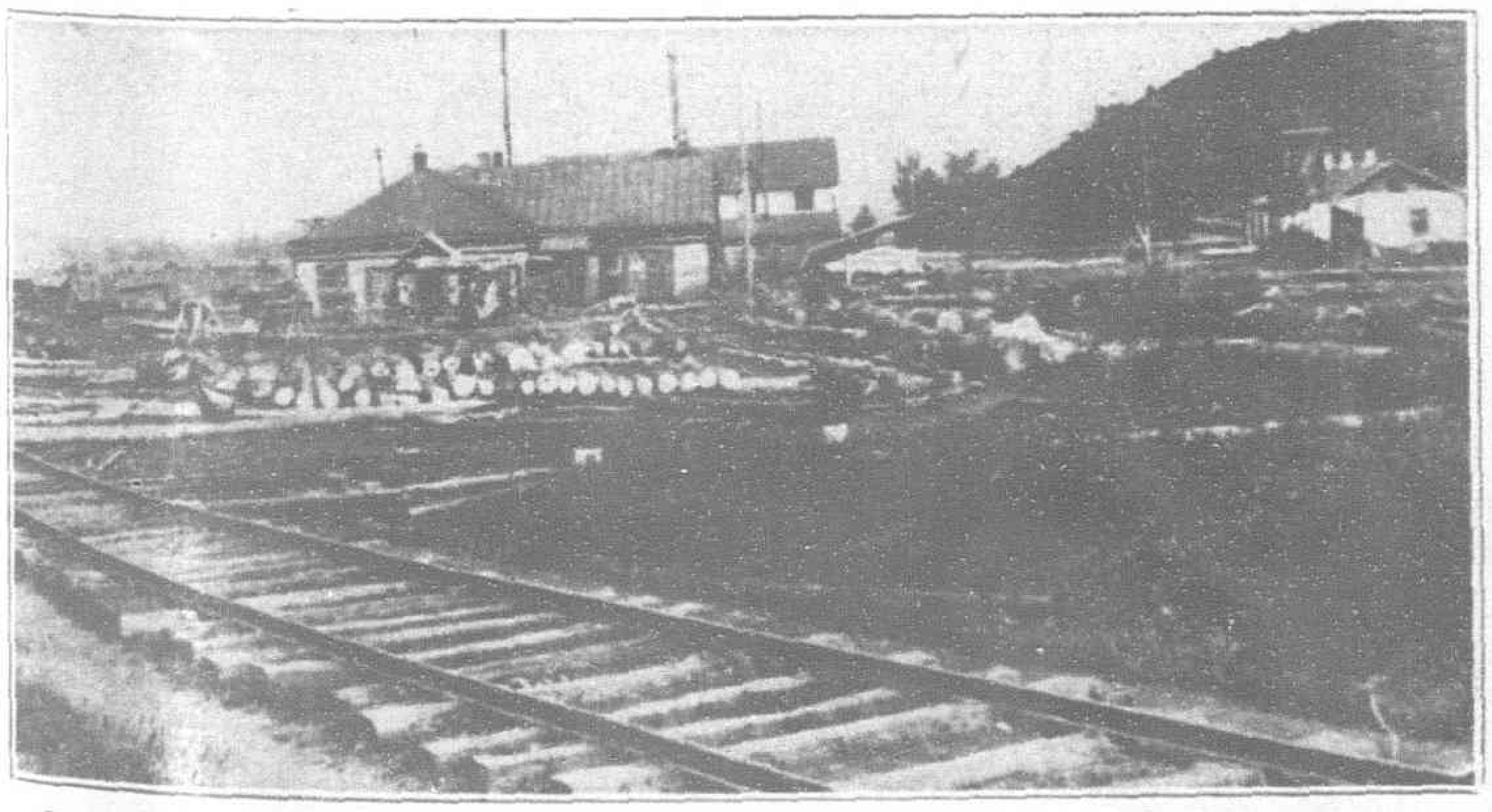
At the opening hearing of the trial, which was on June 3, exactly eight months from the date of arrest, all the lawyers for the defence—five of the leading Russian lawyers and all men of experience—protested against the hearing of the case, asking that the accused should be discharged by virtue of the Amnesty Mandate of the Chief Executive. This was over-ruled owing to the order of Marshal Chang Tso-lin, who decreed that three classes of prisoners in the Special Area should not benefit by the Amnesty, and Ostroumoff and his colleagues were included in the third classification. Counsel then proceeded to show the Court that none of the accused were Government officials, and that Marshal Chang's order only applied to Government officials. Documentary evidence was furnished that Ostroumoff received his appointment from the Russo-Asiatic Bank, which was confirmed by the Directors of the Railway, and had nothing to do with the Chinese Government; also that the Chinese Eastern Railway was purely a Government enterprise. This had no effect on the judge, who stated he would proceed with the case. Another point brought up was that, according to Chinese law, the court may keep prisoners in custody without presenting an accusation for six months only. If in six months no indictment is drawn against the person in question he should be released. In the case of Ostroumoff this law has been transgressed, and, however peculiar it may be, the judicial authorities, when making up the total of the term, left out the time they spent in clearing up the question whether the amnesty was to be applied to Ostroumoff or not. Thus it has come about that the accused had spent eight months in prison instead of the prescribed six months before the trial came on.

Boris Ostroumoff, ex-General Manager, C.E.R.

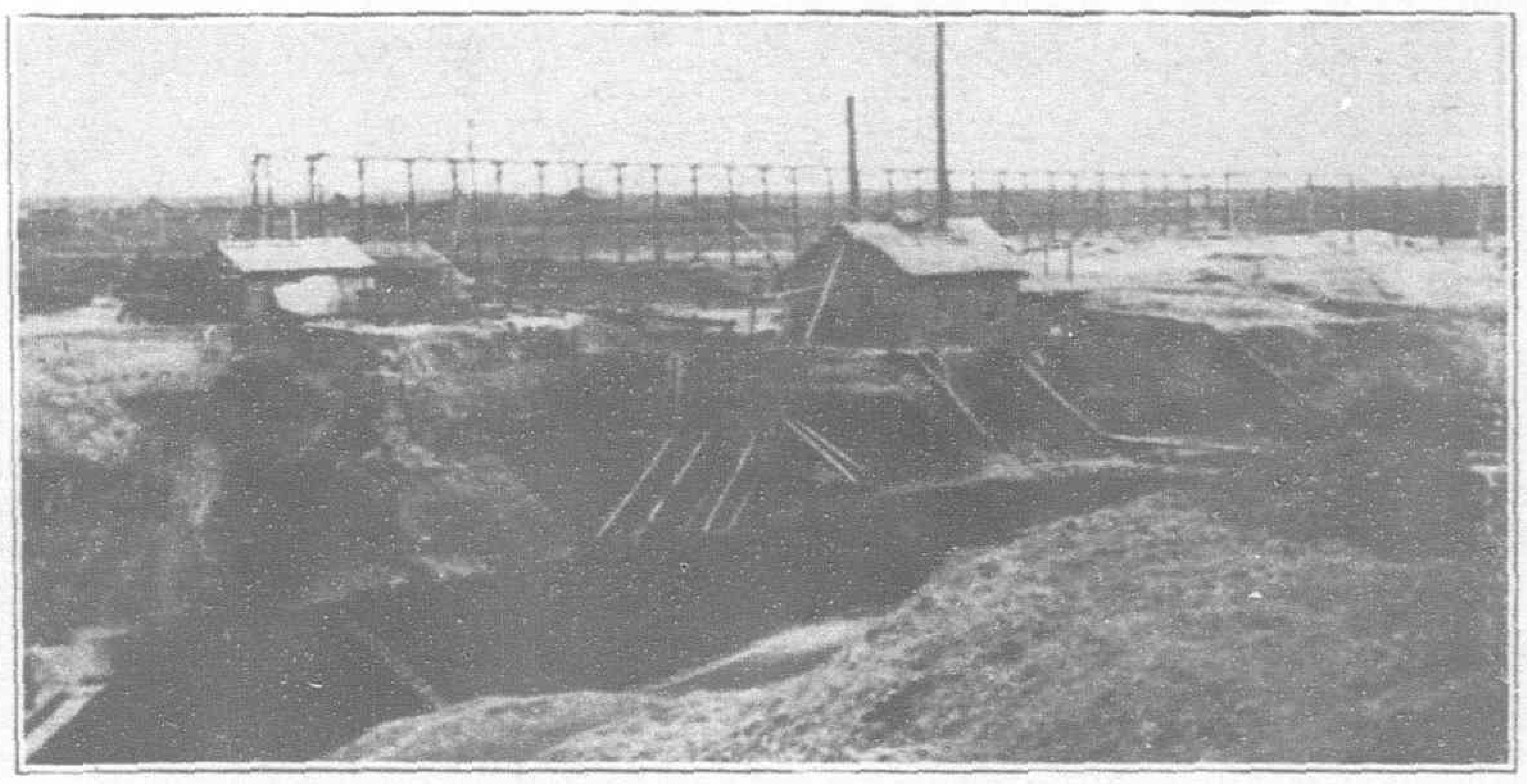
From a foreign point of view, the discharging of the accused is so incontestable that the non-performance of it may become tantamount to a denial in principle of all the bases of the forms of law proceedings, so far as these constitute guarantees of rights. Then, again, the question of formalities in the case is of great significance in judging of the nature of judicial activity itself. Though the trial is a long, long way from being over at the time of publishing this article (the begining of Aug.) one cannot fail to see that the executive authorities in Manchuria are imparting a quality of pressure to the decisions of the court.

On the second day of the hearing Ostroumoff read a telegram which had been sent by the President of the Chinese Eastern Railway to the Administrator of the Special Railway Area, General Chu, stating that the arrest of the accused was based on the request of the Russian (Soviet) authorities, and goes on to say that the Chinese Eastern Railway Directors should present documentary evidence against the accused in order to observe the law, urging the receiver of the telegram to see that what was necessary was carried out in order that there should be no protests from diplomatic circles. This telegram produced a sensation in court when read, and much surprise was evinced that it should be among the documents that the prosecuting attorney has attached to the accusatory act. The producing of this telegram in court has strengthened the conviction that many people hold, that the case against Ostroumoff is more of a political than a criminal nature. This conviction becomes stronger and stronger as the case proceeds, on account of the attitude taken by the presiding judge and the arbitrary actions he resorts to. Times out of number the counsel for the defence rise and protest against one and another thing, but without success. The prosecutor has presented no direct evidence against the accused from the Board of Directors; therefore Ostroumoff rightly argued he should be discharged, seeing that his employers were the Directors and that the vague accusations by other people, some actually not in railway employ, cannot be taken seriously by the court.

(Continued on page 557.)



General View of the Saw Mills at the Timber Concession at Shitahotze



The C.E.R. Coal Mines at Jelainor

Hokkaido—The Diffident

By Frederic de Garis, F.R.G.S.

The writer of the following article is the editor-in-chief of the guide-books published by the Japanese Government Railways, and as such can be depended on to present only the exact and detailed facts about such places as he visits. He gives an illuminating survey of the conditions in this comparatively unknown island of Japan, which is in reality the third largest of the group composing the Japanese Empire proper.

HOKKAIDO (literally "North Sea Districts"), the large island north of Japan Proper, is best reached from Aomori, near the northern tip of the main island. To its nearest principal port, Hakodate, 60 nautical miles distant, two express steamers of the Japanese Government Railways make the run daily in about five hours.

In company with Mr. Torao Oita, the distinguished traffic manager of the Japanese Government Railways, the writer made an official visit to Karafuto (Japanese Saghalien) for the purpose of learning something about the resources, conditions, climate, etc. of this northernmost colony of Japan, which is about 1,000 miles north of Tokyo. Upon returning to Hokkaido it was decided to make an extensive tour of the island, so that the actual conditions existing there could be seen and considered from a foreign viewpoint, and also to determine the truth or falsity of the statement, so often loosely made, " that there is plenty of room in Hokkaido for the Japanese, but they will not go there because it is too cold—they will only settle in warm countries."

Hokkaido proper has an area of 31,825 square miles; with the outlying islands, the Kuriles and others, 36,810 square miles. Its geographical features are quite different from the mainland of Japan. The island's extensive plains, wooded hills and other features are similar in many respects to parts of America, though much of its surface is mountainous and rugged, which, even when cleared of timber, is unfit for farming purposes.

From the latest available official figures, Hokkaido had 101,052 acres under cultivation, 75,039 acres in stock farms, and 14,424,291 acres, or 22,574 square miles, of timber lands, of which about 48,800 acres are opened yearly for settlement. Thus, it will be noted, the island's area roughly is divided in about the proportion of three-quarters of mountainous and timber land and one-quarter now in use for farms and grazing lands. From which it appears that the greater part of the area of the island is not available for settlement, and, taking into consideration the table of population that follows, the above figures show that emigrants have taken up the land as fast as it has been cleared.

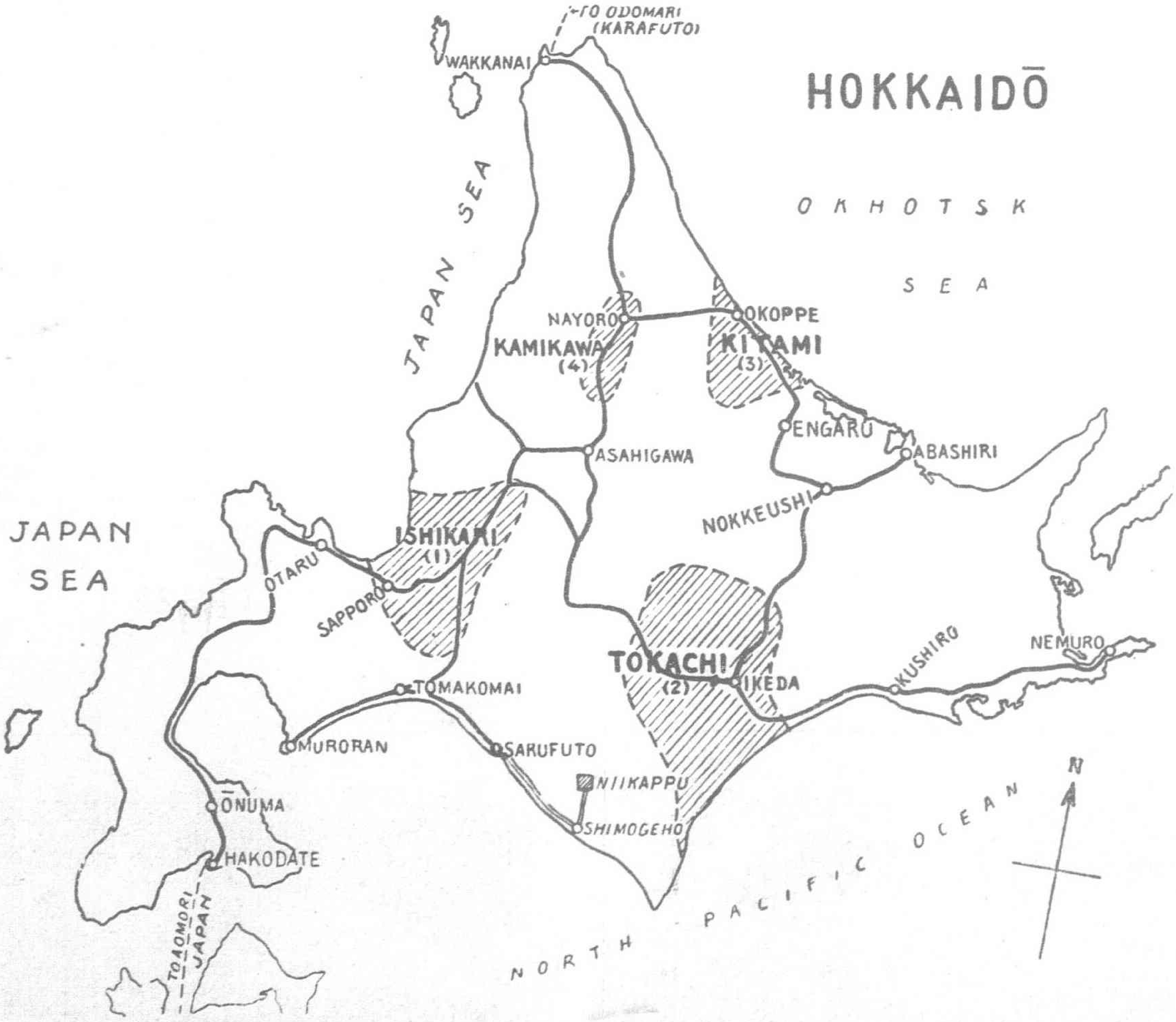
Hokkaido has a population of nearly 2,500,000. Its steady growth is shown in the following table :

Year	*Population*
1877	191,172
1887	321,118
1897	786,211
1907	1,390,079
1917	2,088,455
1921 (National Census)	2,359,097
1923	2,500,000

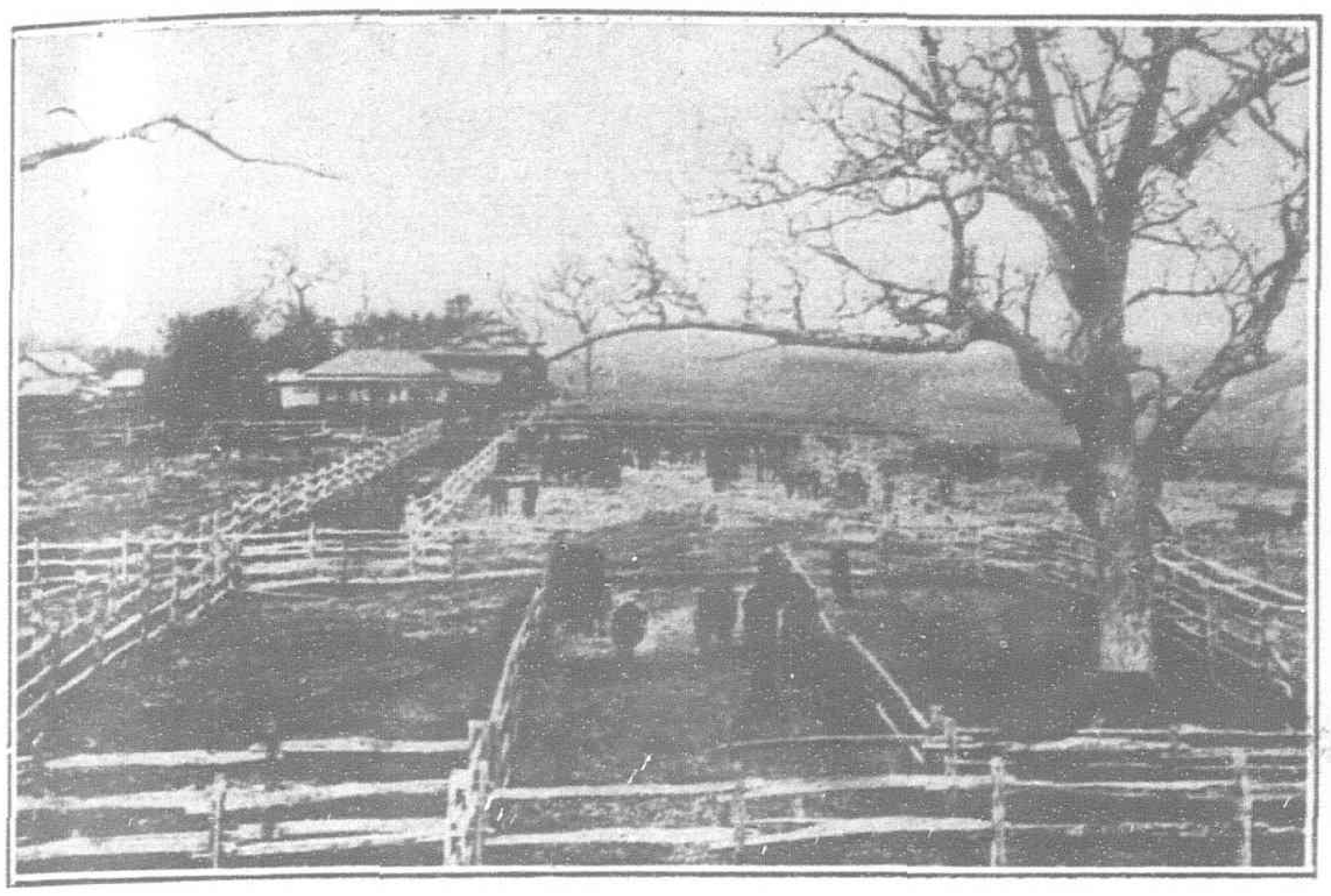
The 1923 total is estimated ; it is a little less than 2,500,000, but roughly it about equals the population of Tokyo.

There are now 1,259.1 miles of Government railways on the island and 118.4 miles of private railways. New lines and extensions of existing lines are being constructed by the Government, and railway construction will be continued until all important parts of the island are provided with transportation facilities ; but far in advance of prospective railway facilities the writer saw large farms with a wealth of diversified crops which appeared to have been long established, and this is true also of places without any prospect of direct railway service—a fact learned on a 15½ mile walking trip to Sounkyo, a noted canyon at the head waters of the Ishikari river, in the center of Hokkaido. There, along the roads and trails, primitive farmhouses are tillable, and beans, corn and other crops are being grown. These facts seem to belie the statement that the Japanese will not settle in Hokkaido.

Although the island is in the same latitude as the northern tier of States in the United States, its winter climate is more severe, being similar to that of North Dakota, but much more humid—on account of the surrounding seas. Real winter



Sketch Map of the Island of Hokkaido, the northernmost of the three main islands of the Empire. The shaded portions show the three large plains or valleys which are so ably described by Mr. de Garis. With an area of a little over 31,000 square miles, the island is served by about 1,300 miles of railroads as shown by the black lines on the sketch. Its principal city is Sapporo, and its two largest ports Hakodate and Otaru.



Imperial Pasture, Niicap, Nitake Province

Oxen Depastured, Sasaki Pasture, Shiramuka Mura, Kushiro Province

begins in mid-December and continues until mid-March, but the season extends over five or six months, during which time the ground is covered with snow. The snowfall is heaviest in the western districts, where in the northern part it sometimes reaches a depth of six feet. On the Pacific side the snowfall is seldom over a foot in depth, and in this district many horses and cattle are bred and raised, but in other districts the long winter and the costly item of fodder is a deterrent to livestock farming. The principal dairy centers are, therefore, in the southern part of the island, and large quantities of condensed milk, butter and cheese are exported annually from them.

In Hokkaido there are four great plains or valleys—every inch of which, and often the adjacent hills, is under cultivation. All are well provided with railway facilities. These plains are given here in their importance with relation to their products:

(1) The *Ishikari Valley*, which, beginning close to Sapporo, extends north-east for seventy miles, and is ten miles wide at its widest part. On this plain 70 per cent. of the rice grown in Hokkaido is produced, besides diversified crops: beans, corn, potatoes, wheat, oats, barley, hay, rape-seed, etc.

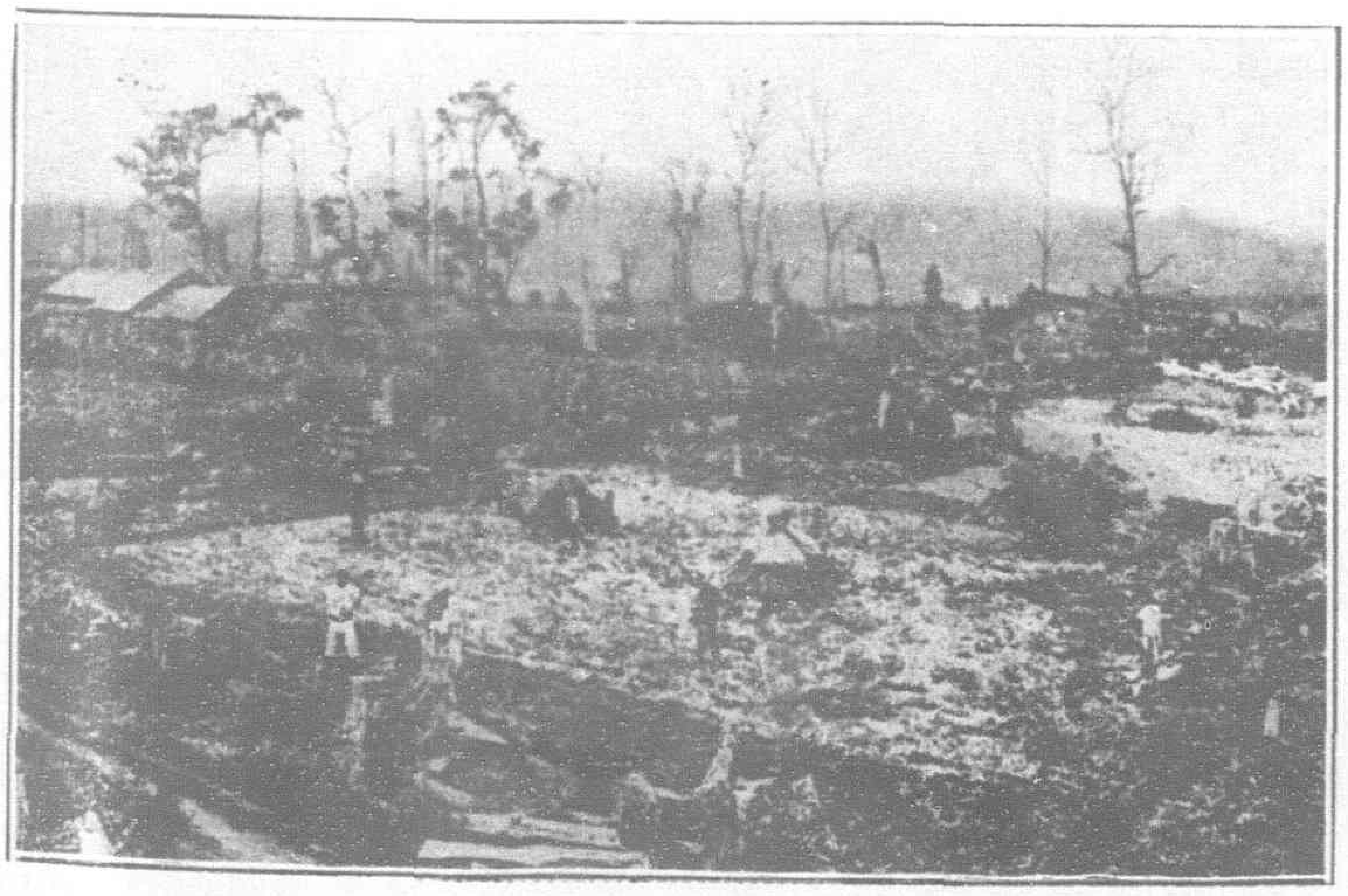
(2) The *Tokachi Plain* is the large agricultural district extending out from Ikeda, in the southern part of the island, on which is grown great crops, and recently sugar beets to supply the mill of the Hokkaido Co., at Obihiro and that of the Meiji Sugar Co. at Shimizu, not far distant. Both these mills, operated under the supervision of American experts, are equipped with modern machinery. They expect to handle 70,000 tons of beets this year, these facts being mentioned to show the present extent of this infant industry. The farmers are supplied with the best qualities of seed and are given a guarantee for the pruchase of their beets at a fixed price per ton.

(3) The *Kitami Valley*, between Nayoro and Okoppe, in the northern part, is a plain which produces abundant crops of many kinds, and between the last two districts named there is an extensive area, of which Engaru is the center, on which is produced a superior quality of peppermint, well known in international trade. About 250 tons of this are harvested yearly, almost all of which is exported. The lumber out of this district is an important factor in domestic trade.

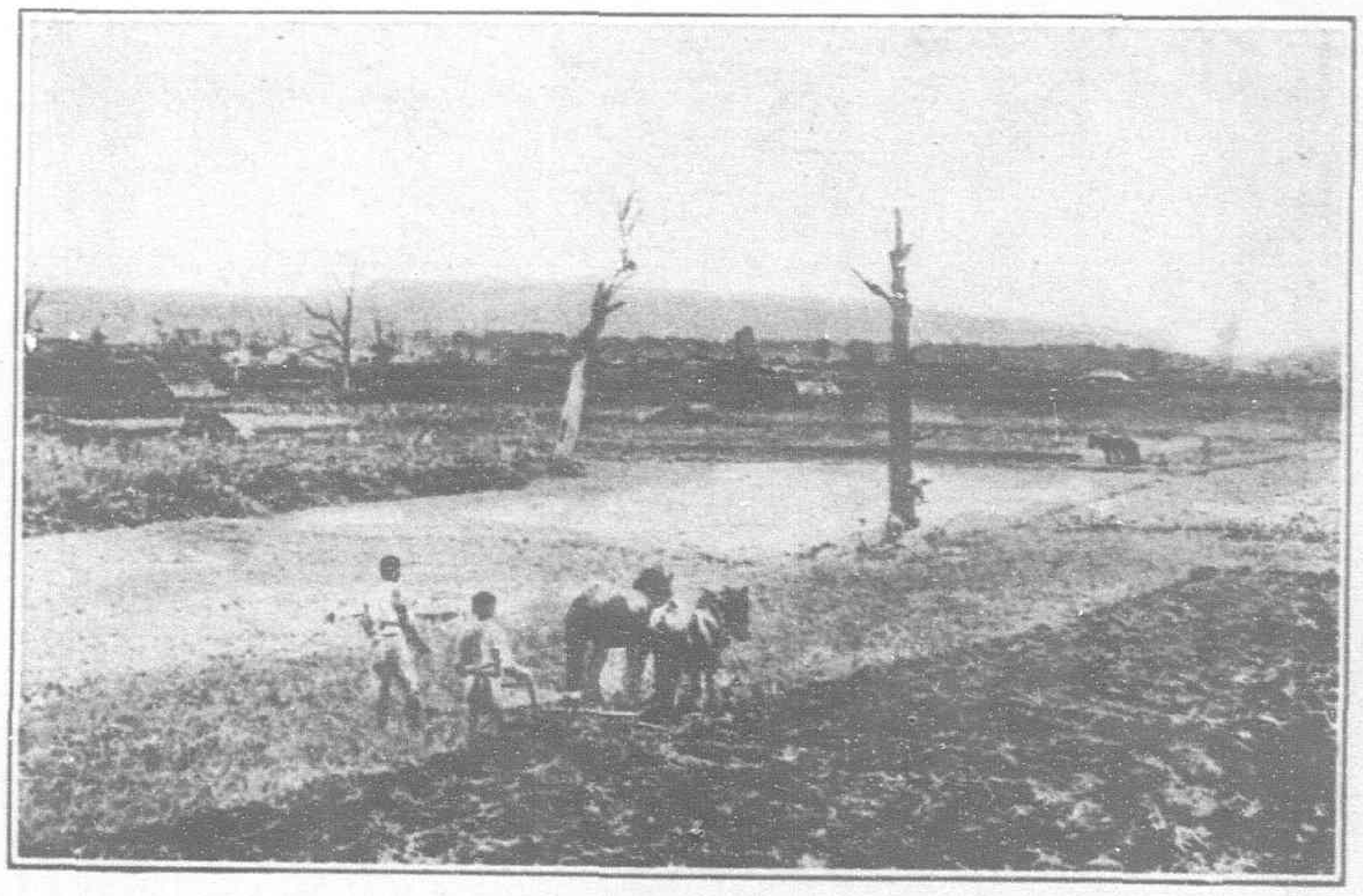
(4) The *Kamikawa district*, west of the Kitami Valley, has, besides rice fields, large areas planted to diversified crops. In all four sections, and elsewhere on the island, the land given over to bean cultivation is amazing. It was learned that the bulk of the crop is exported to America, where it is used as the base for talcum and other toilet preparations. Besides these great plains there are three large areas embracing small valleys and hills, all the former being under cultivation, the latter being used for stock raising. These areas are in the Nemuro section (588 square miles), the Kushiro section (2,274 square miles), and the Hidaka section (354 square miles). The latter includes the Niikappu stud farm of the Imperial household.

Hoddaido produces approximately 6,000,000 bushels of rice annually, valued at Yen 30,000,000, but as this is not enough for its needs, considerable additional quantities are imported. The important crops are those mentioned above—the usual crops of other countries in the same latitude, with the exception that wheat is not so extensively grown. The Sapporo Agricultural College is noted for the high standing of its graduates, who come there from every part of the Empire. This college, together with its experimental farm, has done much to improve and increase the agricultural products of Hokkaido. Besides the field crops, apples and other orchard products are grown in many parts of the island.

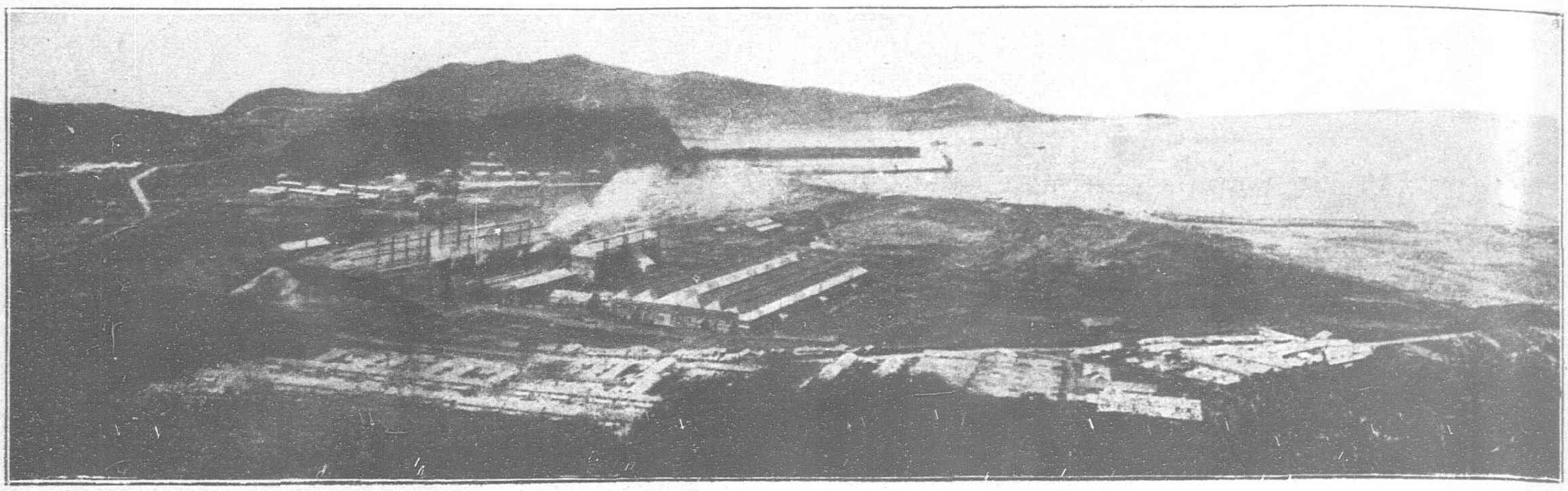
The fishing industry has had the greatest development, its annual value averaging Yen 96,000,000 in fresh and cured fish and fertilizer, the principal items of which are herrings, sardines, salmon, cod—besides seaweed. Travelers who have made approach to Hakodate on a clear evening will not soon forget the impressive sight of the fishing fleet through which the steamer passes. On every side are hundreds of lights, each boat showing a lantern, some in groups, some in long lines, the whole appearing like a well-



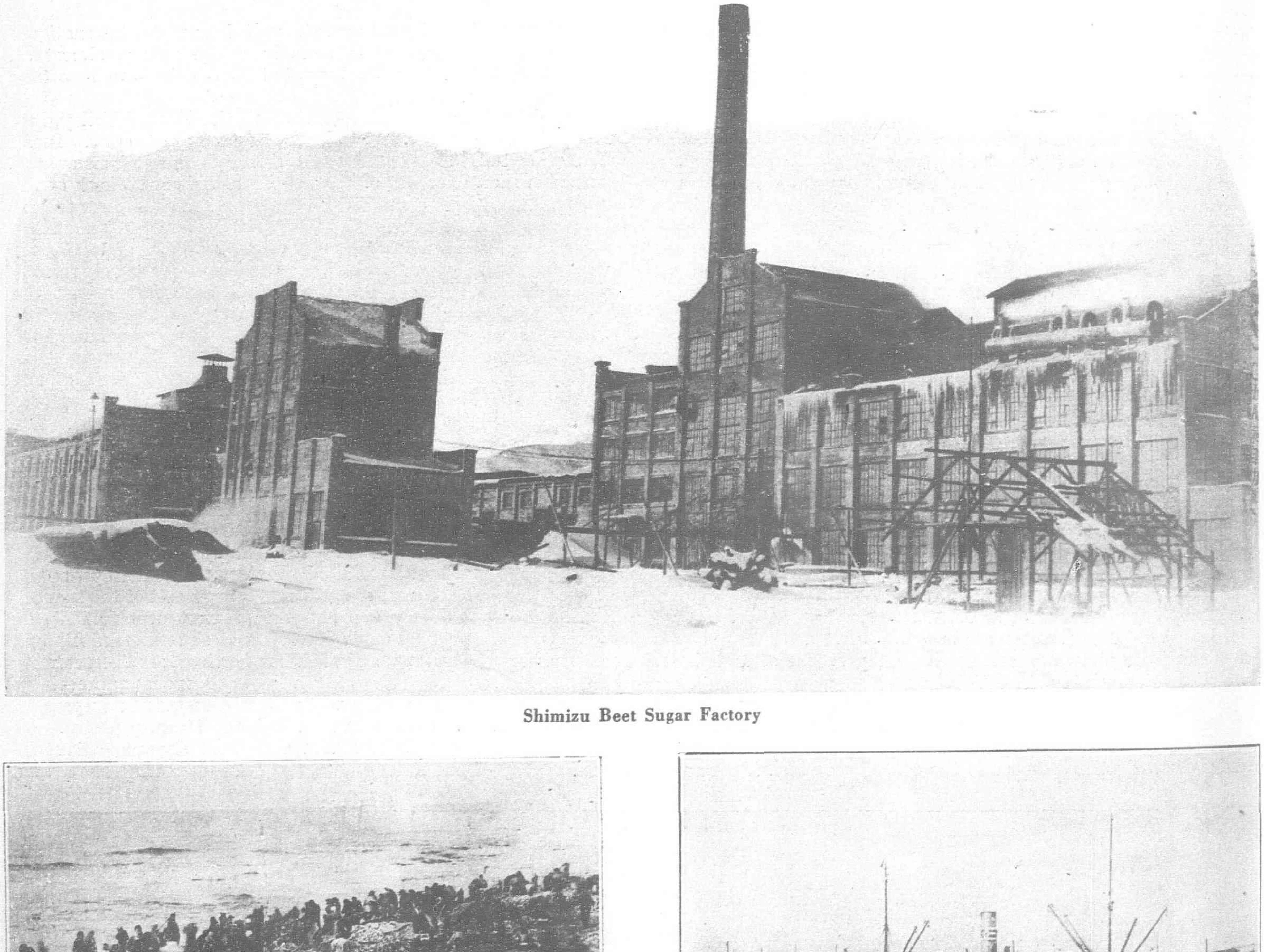
Field brought under Cultivation, Shimo Furano Mura, Ishikari Province



Cultivated Field under Plow, Shimo Furano Mura, Ishikari Province

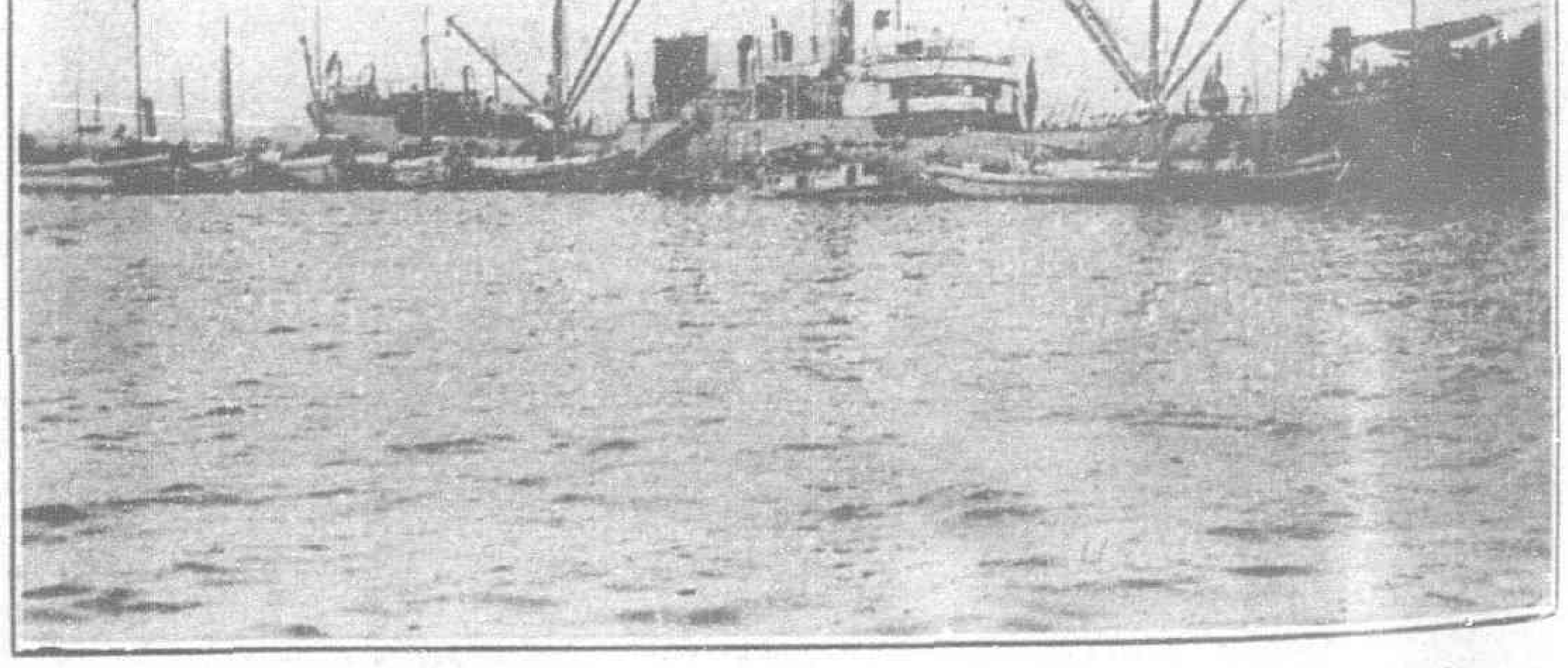


The Japan Steel Works at Muroran, in Hokkaido

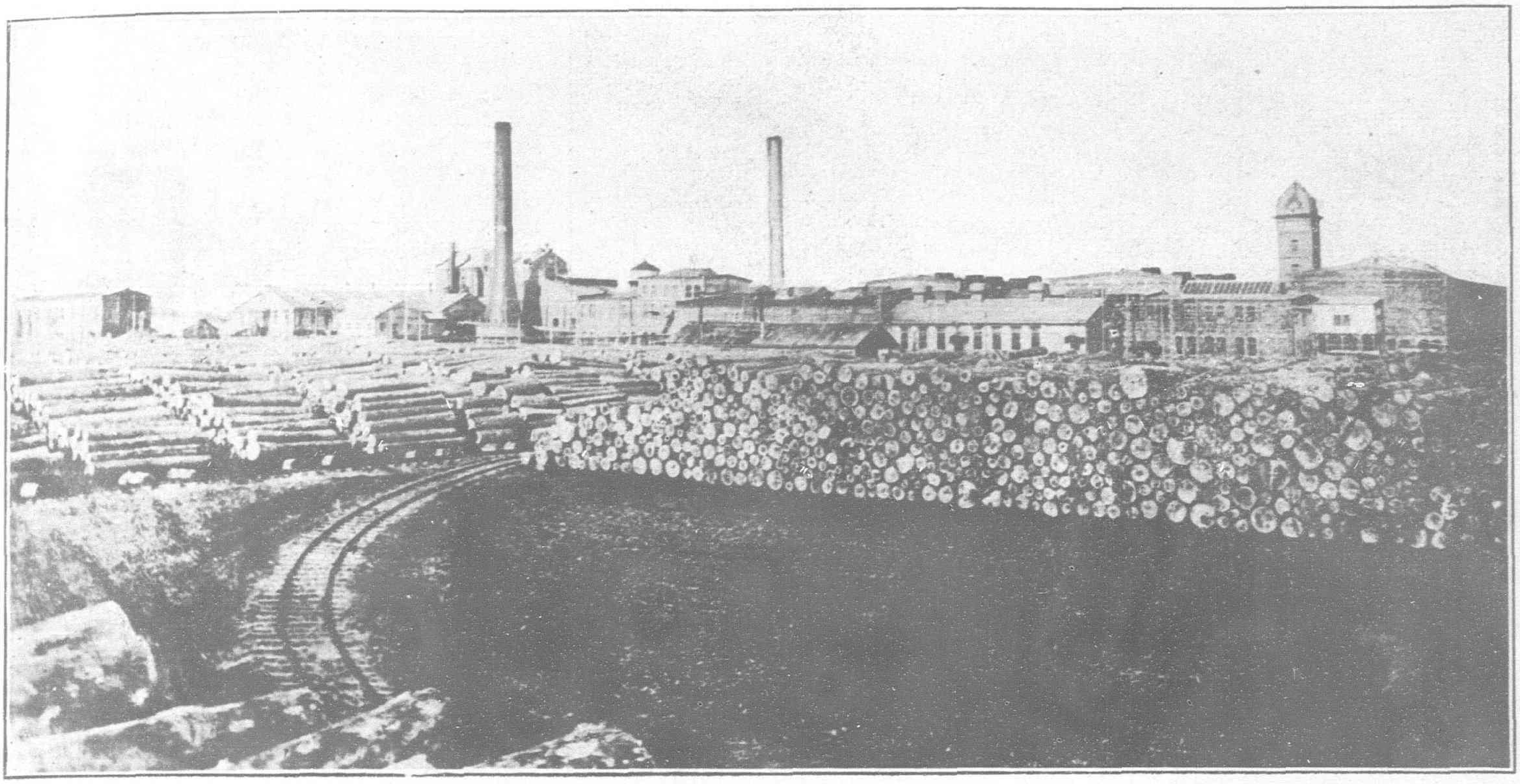


Shimizu Beet Sugar Factory

Hokkaido Fisheries



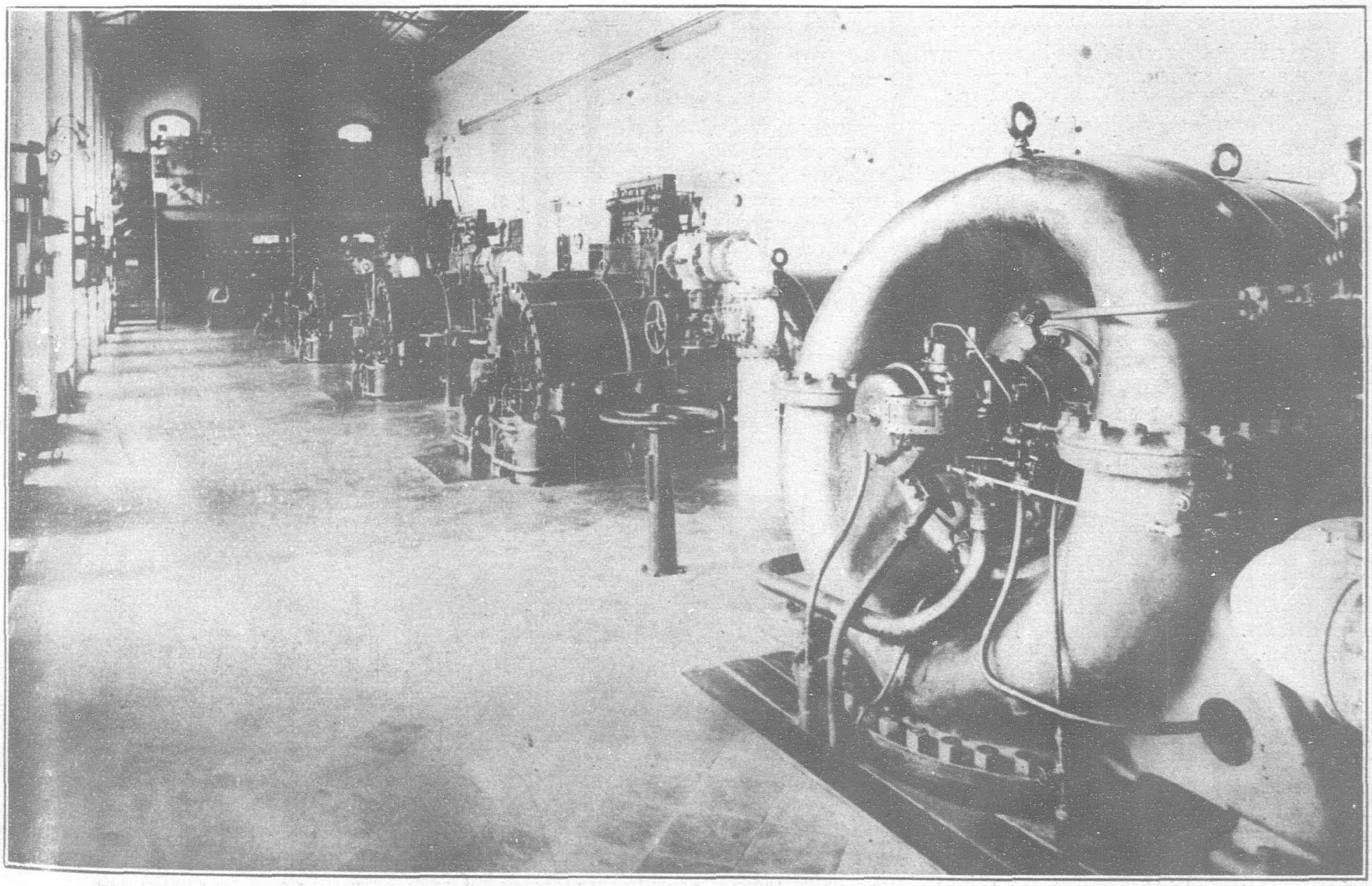
The "Yubari Maru," 6,200 tons, one of the Coal Fleet of the Hokkaido Tanko Kisen Kaisha



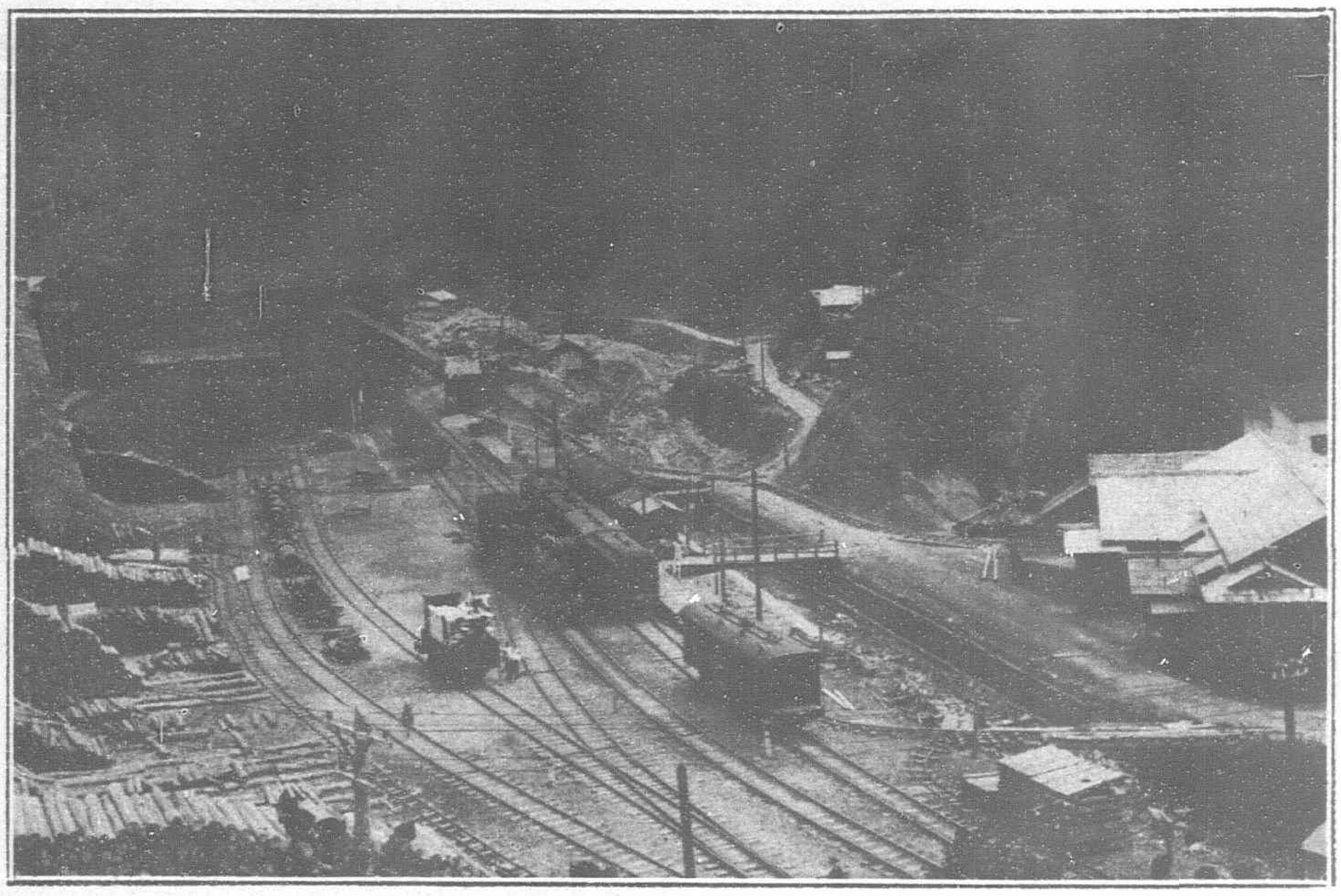
Oji Paper Company's Mill at Tomakomai, Hokkaido, where 85,000 tons of news print paper is produced annually

lighted city on the sea—and just beyond is Hakodate, on the hillside, sparkling with electric lights—a miniature Hongkong.

Hokkaido has a wealth of forests, the wooded area amounting, as before mentioned, to 14,489,203 acres. The principal varieties of trees are the *Ezomatsu* and *Todomatsu* (the former similar to the spruce, the latter to the balsam fir used in the manufacture of pulp in America), oak, alder, maple, etc. The output of the forests was valued at Yen 45,751,012, of which timber, logs and boards totaled Yen 22,331,574 ; pulp, Yen 6,740,883 ; matchsticks, Yen 464,907 ; railway ties, Yen 953,996 ; fuel, Yen 9,871,676 ; and



The Central Power Plant of the Hokkaido Tanko Kisen Kaisha, supplying power to all mines of the company, equipped with 12 B. & W. Boilers; 4—1,000 k.w. General Electric-Curtis turbo-alternating sets of 3,300 volts, 3 phase, 3,000 r.p.m; and two 1,500 k.w. G. E.-Curtis sets of 1,500 k.w.



The Noborigawa Colliery

charcoal, Yen 5,387,976. The largest paper mill in Japan is located at Tomakomai, on the Muroran line. It is owned by the Oji Paper Manufacturing Co., of Tokyo, whose modern plant, representing an investment of Yen 35,000,000, has a daily output of 250 tons of finished paper ready for the printing presses. This company has three mills in Karafuto and mills at other places. Its paid-up capital is Yen 51,000,000. At Ikeda is the large pulp mill of the Fuji Paper Manufacturing Co., and other mills are located at various places. Reforestation is being made to recoup the annual timber cut.

At Yamuwakka, near Ikeda, is the veneer mill—the largest in Japan—of the Nitta Belting & Veneer Co., of Osaka, which, besides the native woods, uses wood from the South Sea Islands—mahogany and other varieties—in the manufacture of veneer. It now produces five million square feet yearly (50 per cent. of capacity), 20 per cent. of which is exported to China, Australia and Great Britain. The principal business of this concern, however, is that of extracting tannin for their Osaka leather-belting factory.

On the south coast, especially in its south-eastern swing from Muroran, stock farming is extensively carried on, both because of the pasture available and the climate. This industry centers around Niikappu, where the great field for horses owned by the Imperial household is located. This stud farm is 15 miles square, thus embracing 225 square miles. It is divided into large fenced fields, the fencing totaling about 187½ miles. An average of 1,000 horses range these fields, and as the snowfall is seldom over a foot in depth, the horses graze on the natural pasture the year round. Only the imported stock is fed—stallions of the best breeds: thoroughbred English racers, Arabians, hackneys, Percherons, and American trotting stock. Their feed is grown on the farm. The surplus stock not needed by the Imperial household is sold. The farm is reached from Tomakomai by a light railway (25.1 miles) to Sarufuto, thence 27½ miles over a splendid motor road to Shimo-Geho, a small town from which the farm is five miles distant. From its entrance it is five miles to the office.

Upon approaching Shimo-Geho we were surprised to see a horse market in full swing. Hundreds of admirable horses, principally two and three-year olds, were in the fields alongside the road and in the market pens ready to be auctioned. We thought it noteworthy that such a large market should exist so far away from the rail lines. Two markets are held annually, in August and October, the former being the more important. After visiting the Imperial farm we went back to the market, where all was bustle and activity—the center of interest being the auction booth, which was packed with buyers.

Not the least interesting feature of this particular trip were the many Ainus seen in this section, there being a number of their villages along the coast. They appear to be more thrifty and prosperous than Ainus seen elsewhere, some of them bringing colts of their own raising for sale at the market.

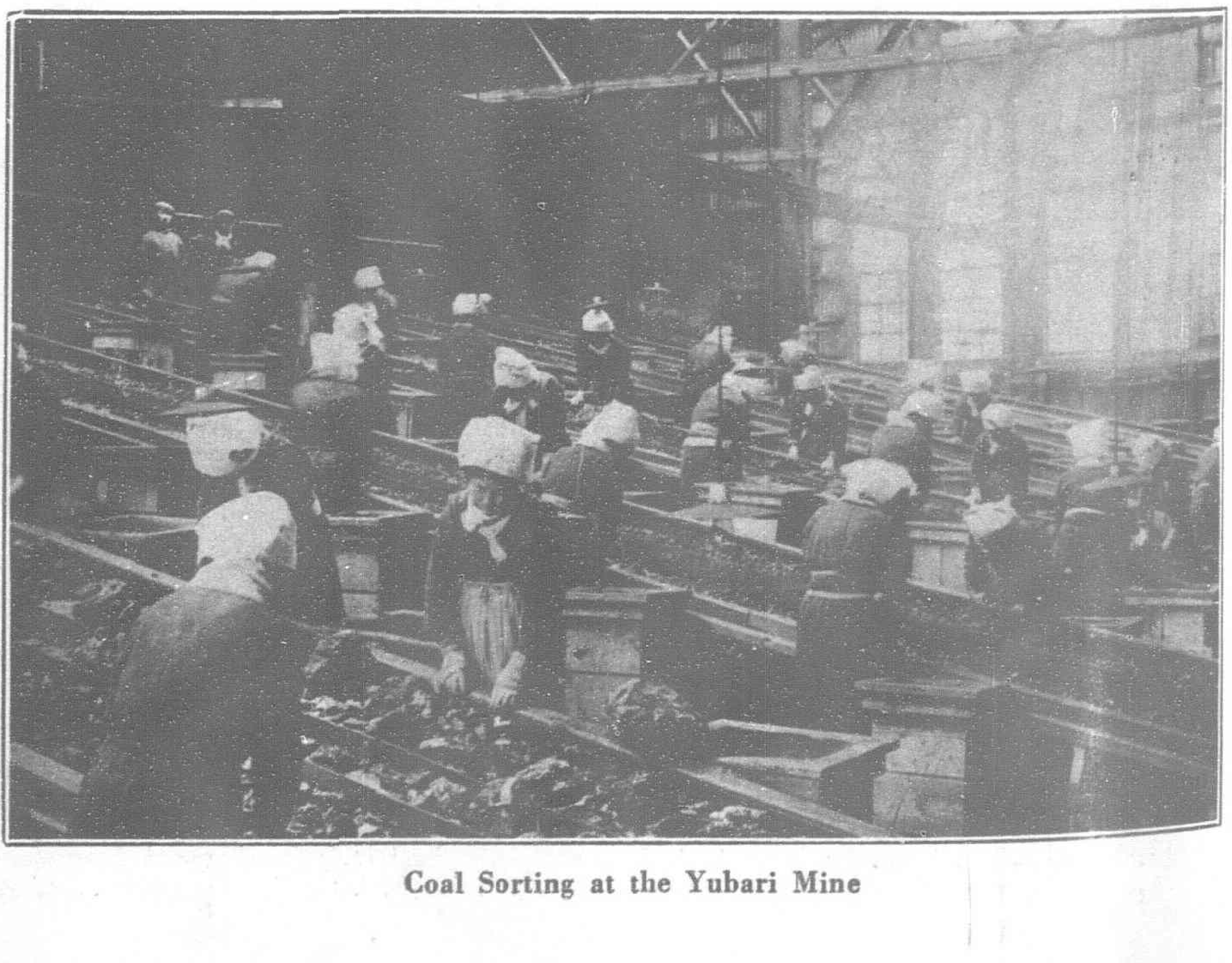
From the foregoing it appears that much of Hokkaido's tillable land is being intensively farmed, and that a steady stream of emigrants spreads out to sections of cleared land away from the railways. The statement that the Japanese are neglecting Hokkaido in favor of warmer climes is not well founded, judging from the writer's observations. They are even going farther north into Karafuto (Japanese Saghalien), where the winters are more severe. For a race whose life, customs, dress, dwellings, etc. are more in conformity with the people of warmer countries, it is much to their credit that so many have made the trek northward, and that the emigration still continues.

Since the above article appeared in "Japan," several new developments with regard to Hokkaido have taken place, an account of which supplements Mr. de Garis's article. The Chamber of Commerce of Hakodate addressed a petition to the Japanese Government requesting permission to enlarge the harbour at an early date.

Hakodate, it is pointed out, ranks with the ports of the main island, as well as those on the mainland of Asia, in its importance as a shipping center, especially since the recent accord between Russia and Japan and the continual development of the hinterland of Hokkaido. The petition asks that a greater percentage of the second Government allowance to ports and harbors be diverted to Hokkaido.

"It is gratifying," says the document, "to note that the Government plans to carry out a second series of development works in Hokkaido. It is almost needless to mention the urgent need for the building of harbors to keep pace with the growing traffic concomitant to the building up of the hinterland. It is our hope that this territory may become one of the most important industrial centers of Japan, as much for the sake of the entire Empire as for our own interests.

"Hakodate is at the entrance of this rapidly developing territory. It ranks first in Hokkaido in population and its trade aggregates no less than Y.400,000,000 annually, including its traffic with foreign ports as well as those on the main



Coal Sorting at the Yubari Mine

island. Exports of marine products to Siberia alone total Y. 35,000,000.

"Notwithstanding this, the port was given only 3 7 per cent. of the Y.38,471,000 appropriated for the reconstruction and improvement of ports and harbors in the first series of development works in Hokkaido. The harbor at Otaru was given Y.350,000 wherewith to construct the breakwater and put that harbor in the best of condition. The Government has thus been providing subsidies to other ports and harbors in Hokkaido, and the improvement of Hakkodate seems to have been allowed to fall behind that of the other ports in Hokkaido.

"The surface area in Hakodate harbor is at present only 570,000 *tsubo*. It is estimated that a steamer requires at least 10 *tsubo* in order to moor in the harbor. There being too little space, the port has been congested with vessels during the past several months, and the traffic is particularly heavy from May to November. An average of 173 ships of a total tonnage of 58,600 has been moored in the harbor daily. This number should be given an area of 580,000 *tsubo*, which is just 10,000 more *tsubo* than is available. The shortage of harbor space would be even greater if the number of lighters and motor boats is taken into consideration.

"The congestion inevitably leads to collisions and other accidents in the harbor, the loss from which is estimated at Y.350,000 annually. This is merely a part of the deficit that results from the lack of adequate mooring space. In addition, the lack of well-built piers is another source of inefficiency. The loading and unloading of cargo have been carried out by lighters and this ought to be improved immediately. All of this points to the immediate need for the reconstruction and improvement of the port at Hakodate."

The Port of Rumoye

The development of Rumoye, another port in Hokkaido, is attracting attention.

To make Rumoye the center for the coal shipping industry in Hokkaido plans are being formulated to establish a corporation to carry out harbor construction work that will cost approximately Y.3,000,000. The building of a breakwater has already been completed at a cost of Y.5,800,000, but considerable dredging must be done in the port to permit calls by vessels displacing more than 5,000 tons.

The port of Rumoye is located on the north-western coast of Hokkaido. It is the most proximitous port to the Uryu coal mines, which are only 30 miles distant. It is also a gateway to the Ishikiri plains, where much of the produce of Hokkaido originates.

The plan to fashion the harbor has been given the support of Mr. Soichiro Asano, president of the Tokyo Kisen Kaisha ; Mr. Korekiyo Takahashi, Minister of Commerce and Agriculture, and many other bankers and financiers in the country, including the Sumitomo interests. When the plans are completed the port will be capable of shipping coal amounting to more than 1,000,000 tons annually, and vessels displacing more than 8,000 tons will be able to call at the port with ease.

As originally drafted, the plan contains the following provisions :

The depth of the harbor is to be made not less than 30-ft. Since the sea outside the harbor is usually rough, the harbor is to be dredged outside the breakwater so that vessels in the roads may be provided safe anchorage in case of congestion inside the harbor. The area to be dredged in this manner will aggregate approximately 35,000 *tsubo*.

Reclamation work is to be done along the coast in the vicinity of Rumoye to the height of about five feet at high tide, and the area thus reclaimed will total about 27,000 *tsubo*. Piers will be constructed to a total length of about 100 *ken*, and other measures will be taken as needed for the protection of that part of the coast. Railway tracks are to be extended to the wharves, so that cargo may be loaded directly on the steamers. The distribution of the appropriation for the harbor is as follows :

Reclamation	Y.123,606
Coastal protection	232,500
Quays	200,000
Machinery	650,000
Other construction	43,894
Supervision in survey	50,000
Dredgign work	423,742
Civil engineering work	15,000
Equipment for coal shipment	35,000
Railway tracks	15,000
Land	57,000
Office	100,000
Reserves	50,000

The construction work is to be started in April and is to be completed in five years. Rumoye has recently celebrated the completion of its new post-office, middle school, and civil engineering works. When the harbor is constructed the coal export at the port is expected to increase greatly.

New Liner for D.E.I. Service

A new vessel, the *Pieter Cornelisz Hooft*, is now being built in France for the Netherlands Steamship Company. She is to be a first-class liner for the Dutch East India service, 540-ft. in length, with a beam of 67-ft. 9-in., and a gross tonnage of 14,000. There are two 4,000-s.h.p.-Sulzer engines, each of which has eight cylinders, with a bore and stroke of 680 and 960 mms. respectively. This is a cylinder size which has been built for many six and four-cylinder engines, but the output represents the highest power yet reached in a Sulzer engine. The power is developed at 100 revolutions per minute, and as is usual with large motors of the Sulzer design, the scavenging air is supplied from separately electrically-driven turbo blowers, the only auxiliaries driven by the main engines being the twin air injecting compressors. As in the case of most large motor liners now under construction, electrical auxiliaries are to be utilized throughout, and three 520-b.h.p. Diesel engines are to be fitted, each driving a generator, besides a 120-b.h.p. plant.

New System of Ship Ventilation for Oriental Voyages

The *Bianchi*, the second of two sister ships built for the P. & O. Company by Hawthorn, Leslie & Co., was launched at the firm's yard at Hebburn, England, toward the end of January. The vessels have seven decks and are luxuriously furnished. The engines develop 15,000 horsepower.

Mr. J. T. Batey, managing director of Hawthorn, Leslie & Co., said the *Bianchi* was one of four building for a special fleet to carry mails and passengers between England and Bombay. A new system of ventilation has been adopted, and all that is necessary is for a passenger to press a button, whether in bed or during the day, to ensure a supply of fresh air. The electric fan system has been done away with. The line purpose adopting this new ventilation system on all future vessels built for their Oriental services.

Oriental Contracts for Europe

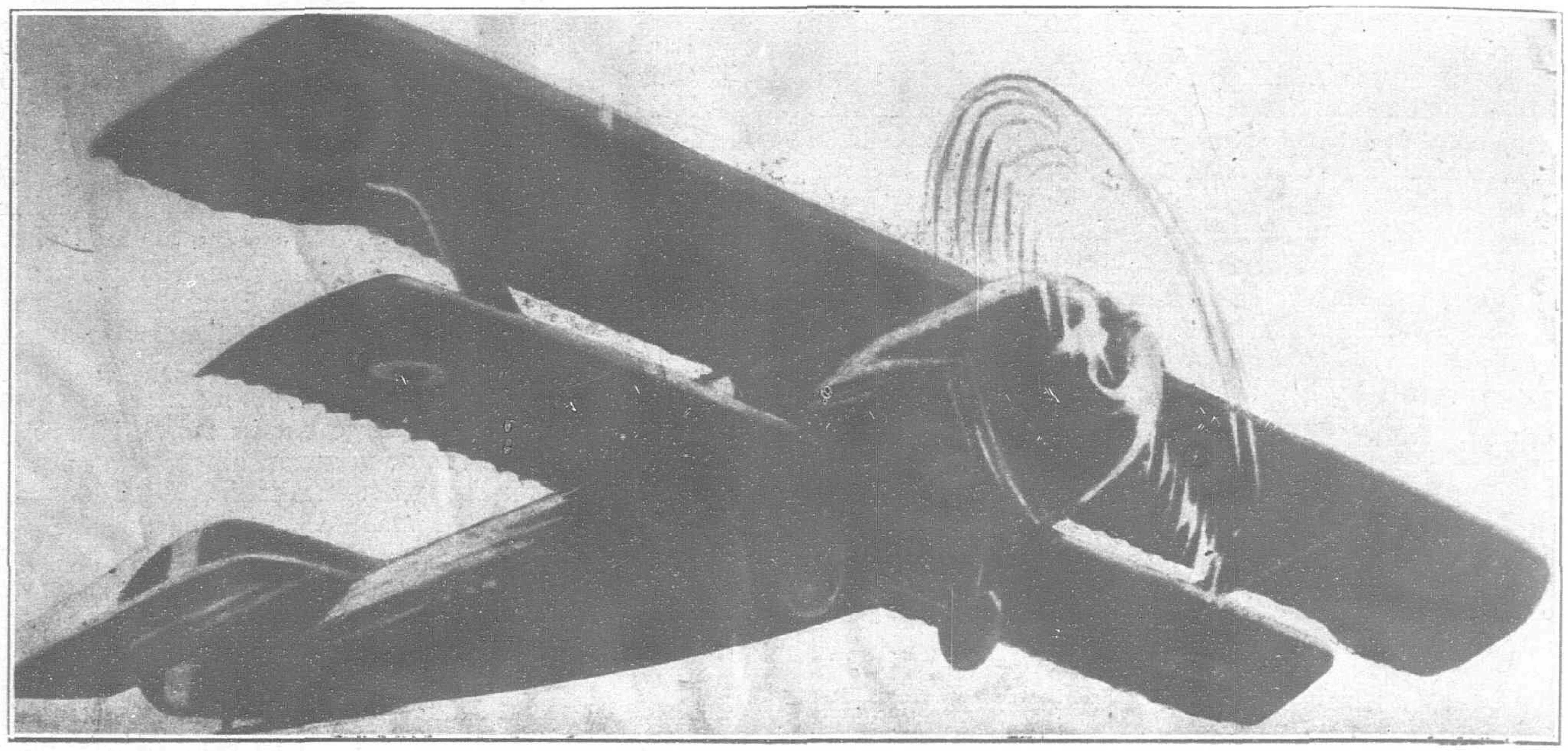
Plans have just been completed for the erection of a new pier at Kamal, Madura, for the Sourabaya Harbor Board, which it is estimated will cost approximately 61,000 guilders.

Sperry Gyroscope for N.Y.K.

The Sperry Gyroscope Company, of London, has just been given an order for a Sperry Gyro Pilot for the *Hakusan Maru*, belonging to the Nippon Yusen Kaisha. It is understood that a number more are to be installed on other vessels of the line. They have already been adopted for general use by the Anchor-Donaldson and Canadian Pacific Lines.

Anglo-Dutch East Indies Tin Syndicate

One of the most interesting of recent tin propositions (representing the introduction of British capital into the Dutch East Indies) has just been formed, with Sir Ernest Birch as Chairman and an influential board, to take up and prospect tin-bearing lands in the south-western portion of Borneo. This district (Matan), which has long been known to be tin-bearing and is said to be geologically continuous with the famous Banka and Billiton islands, was thrown open to private enterprise (by a reversal of policy operating for over seventy years) in 1923, and the concession held by the company covers prospecting rights on eleven contiguous blocks aggregating 238,723 acres. The company, which has a capital of £60,000, will act as the parent company for the flotation of subsidiary undertakings. Mr. A. W. Hooke, M.I.M.M., late manager of the Bisichi Tin Mining Co., and a technical staff are preparing to start for Matan, and a new chapter, the extent of which it is impossible to foresee, is now opening for British tin mining in the Far East.

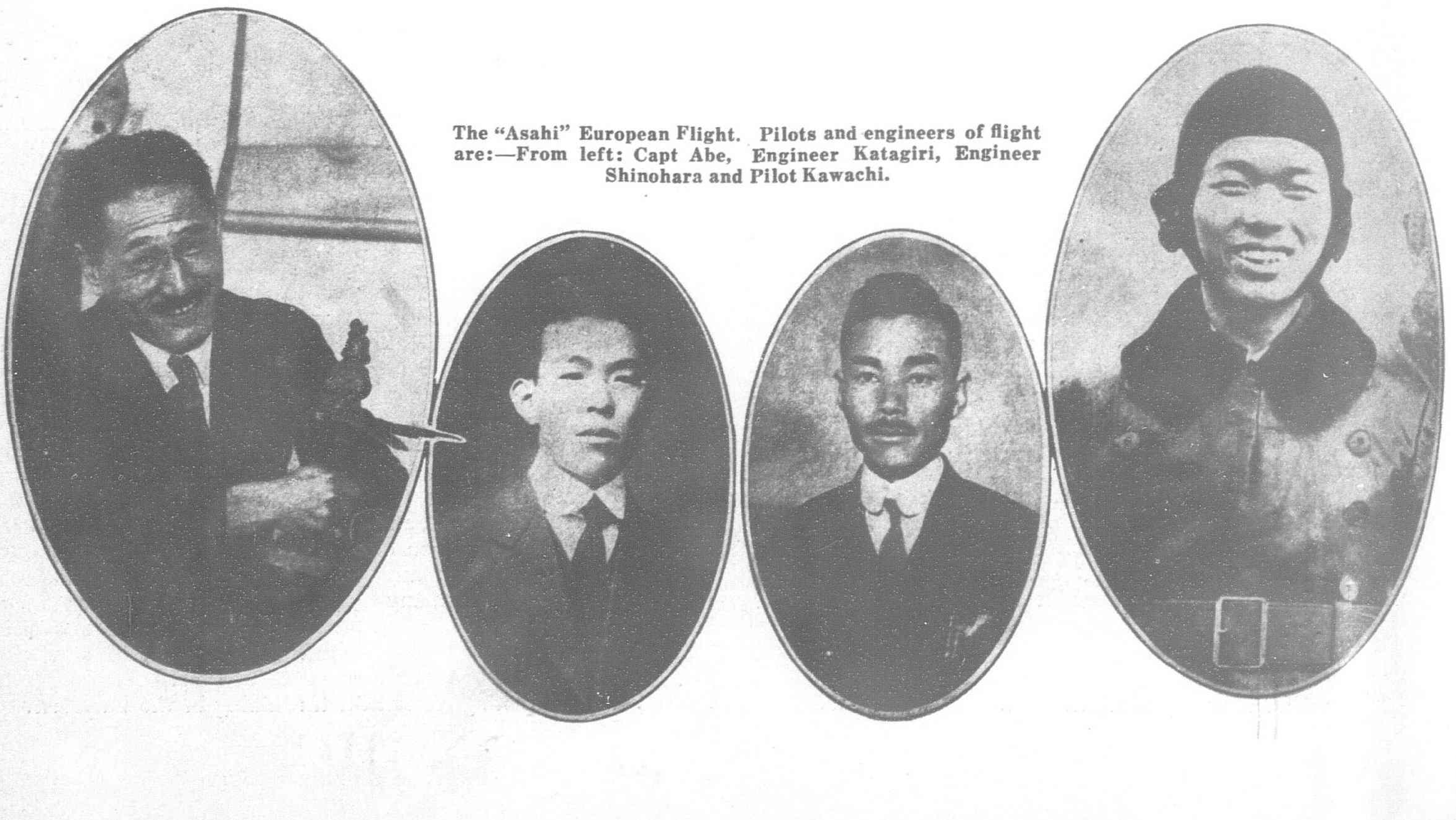


The machines employed in the "Asahi's" Tokyo-Europe flight are two Breguets, capable of an average speed of 180 kilometers an hour. The route over which the flight was made is Tokyo—Osaka—Heijo—Harbin—Chita—Irkutsk—Krasnoyarsk—Omsk—Chervyansk—Samara—Moscow—Warsaw—Prague—Paris

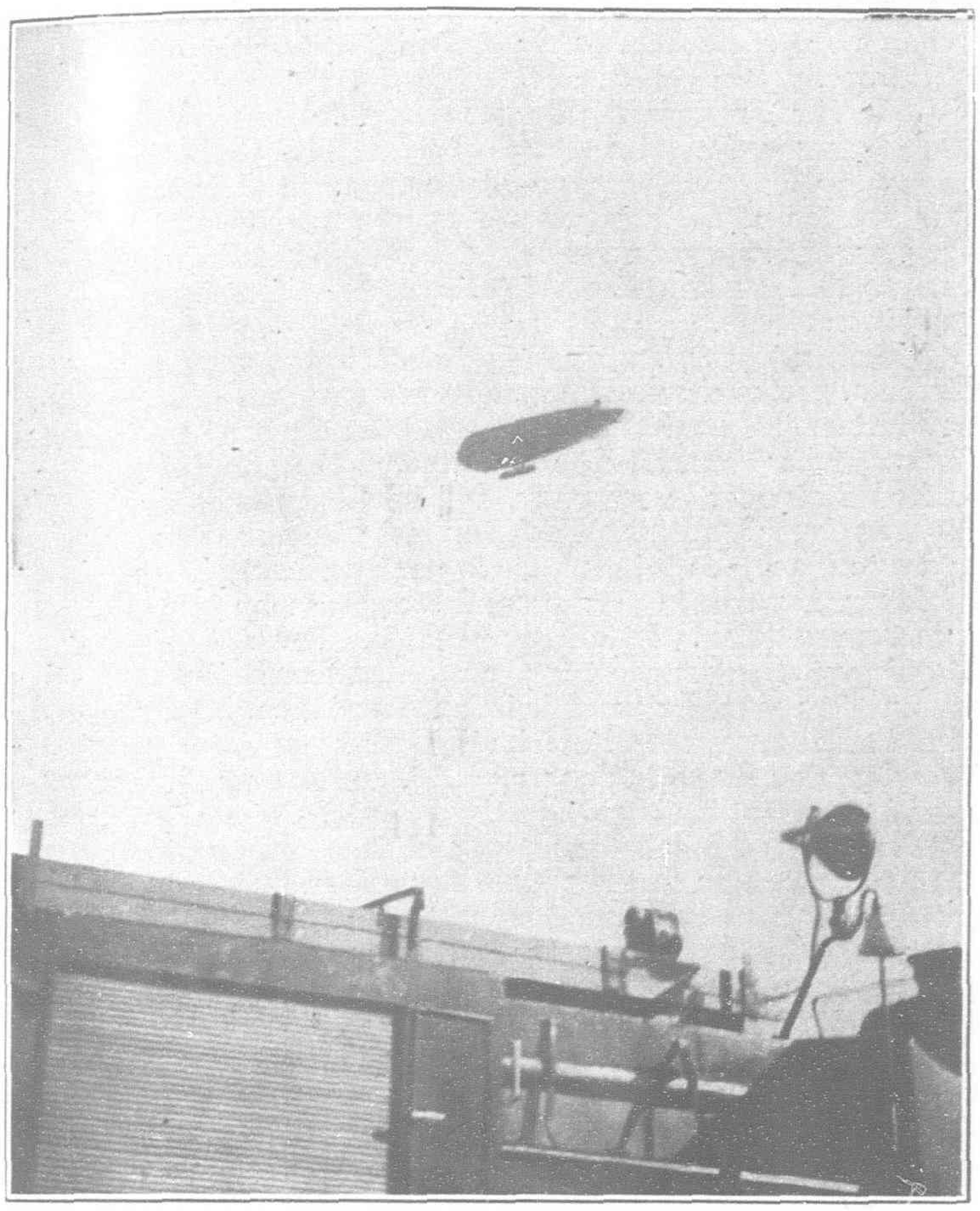
Japan's Place in the Race for Air Supremacy

JAPANESE flyers have flown to Europe as this issue of The Far Eastern Review goes to press. Interest in this flight is naturally very keen throughout Asia, as this will be the first time that an Asiatic people have flown across the European continent.

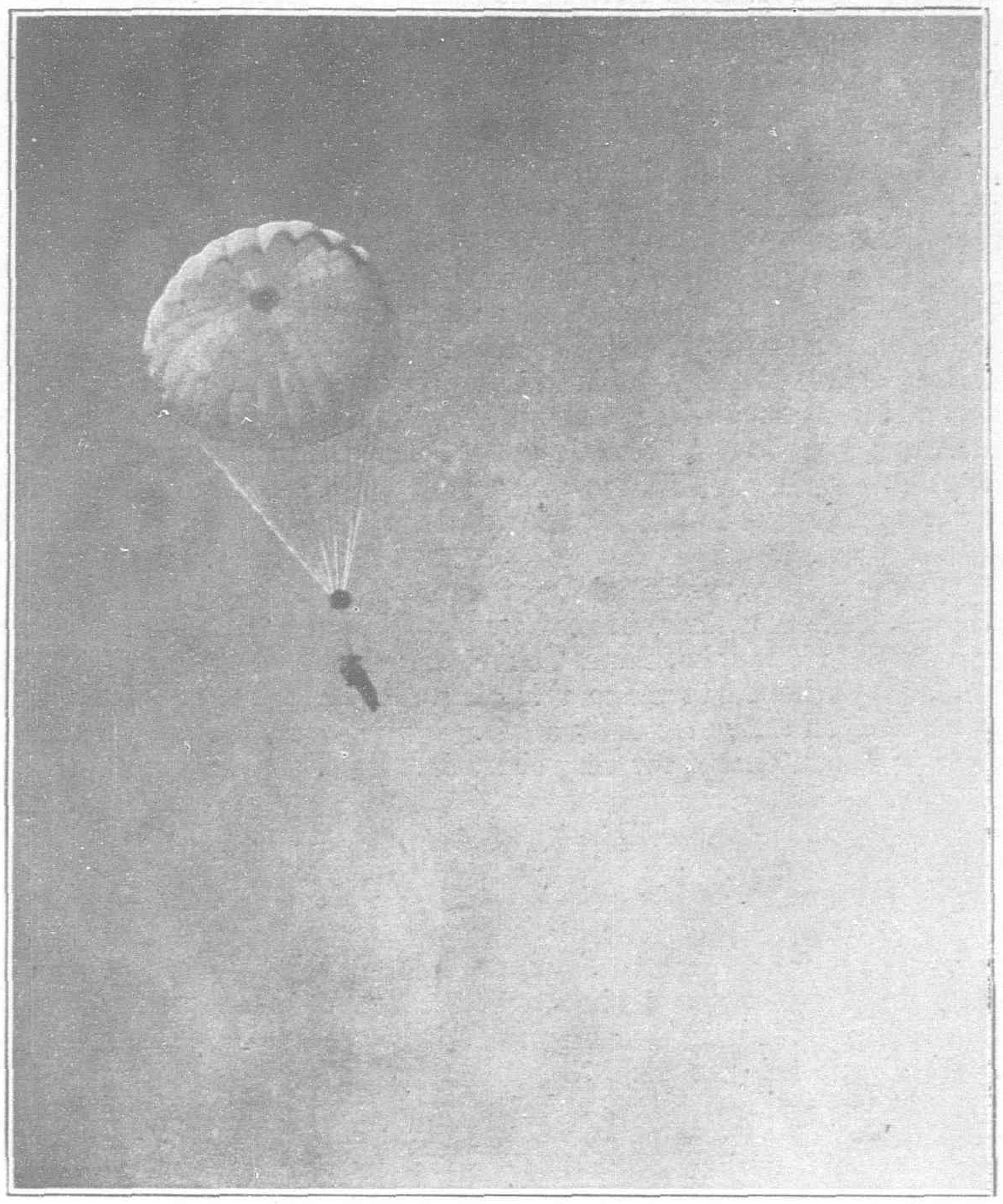
Colonel the Master of Sempill, R.A.F., recently delivered an address before the members of the Japan Society, at the Central Hall, Westminster, on the "British Aviation Mission to Japan," of which he was the head. There was, said Colonel Sempill, every reason to believe that in the very near future an airship service between London and Tokyo would be inaugurated. The airship used would probably be about 700-ft. in length, with luxurious accommodation for fifty or even a hundred passengers. The ships would be capable of travelling about 70 miles an hour, and would probably make flights of from 2,500 to 3,000 miles without a stop. Rigid airships of this type leaving during the summer would travel by way of Scotland, the west coast of Norway and the northern coasts of Russia, and eventually across to Tokyo. The distance was something under 5,000 miles, and the journey would take about four days, during only one of which darkness would be experienced. The advantage of reaching Japan across the Arctic



The "Asahi" European Flight. Pilots and engineers of flight are:—From left: Capt Abe, Engineer Katagiri, Engineer Shinohara and Pilot Kawachi.



The Airship "Astra" Flying over Tokyo

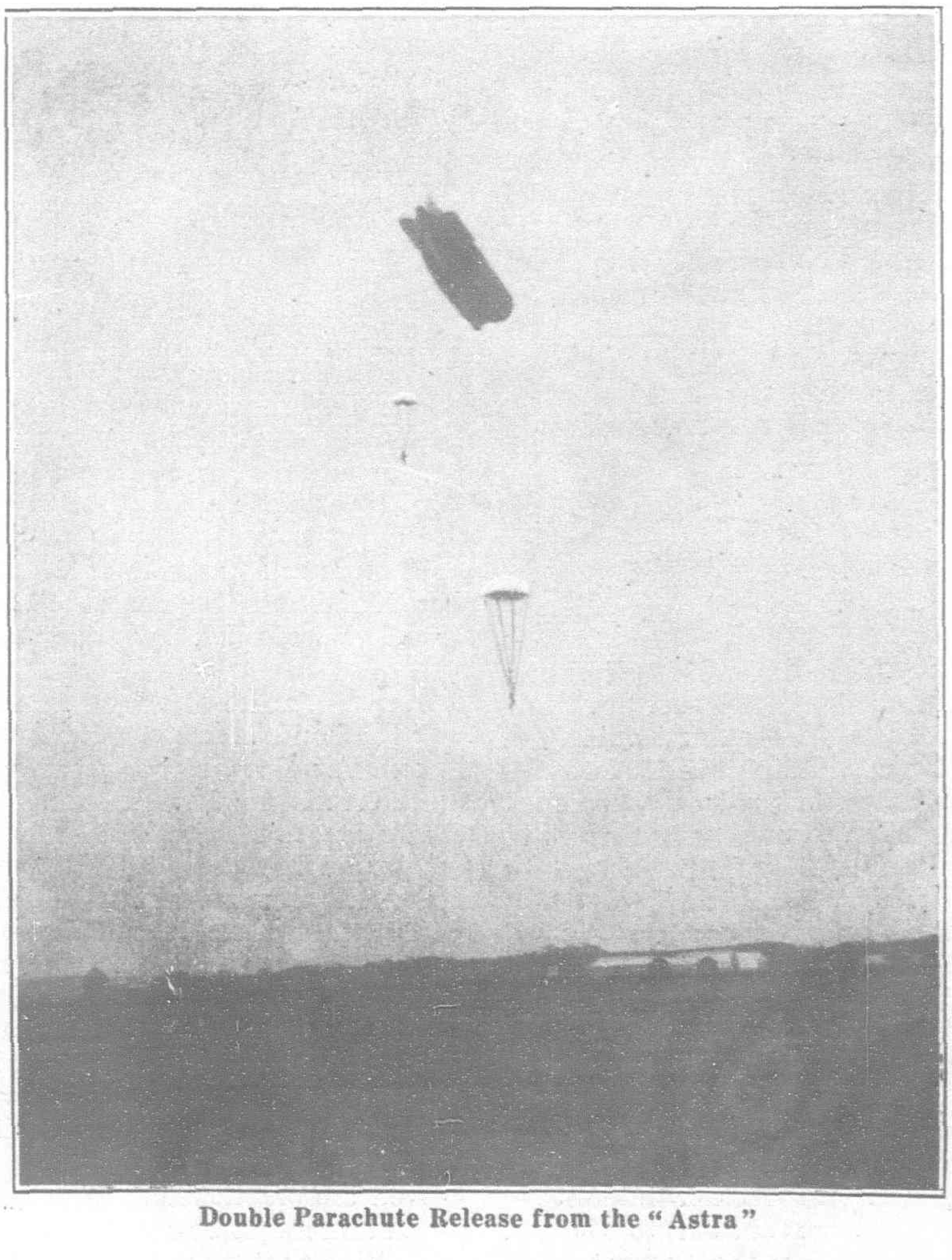


A Parachute Descent

were enormous, and so far as lighter-than-air ships were concerned, he was sure that would be the route eventually chosen for transportation to Japan.

Baron Hayashi said if in the future Japan was enabled to have an air service as a branch of its navy, the thanks would be due to the work of the British mission.

In view of the many alarmist reports that have been appearing in the press of the world with regard to the air preparedness and efficiency of the Japanese army and navy, the *Chicago Tribune* recently undertook to verify these stories, and as a result of its investigations announced that they were grossly exaggerated. This sane conclusion was subsequently corroborated by an excellent article by Alfred E. Pieres, Tokyo correspondent of the *Brooklyn Eagle* and other American papers. Mr. Pieres says that the truth is that Japan lags far and away behind Europe and America as regards aviation. The army and navy aeronautical bureaux are still in an experimental stage, and the best proof of this is that neither branch of Japan's defence forces has yet decided finally as to what type of machine to choose.



Double Parachute Release from the "Astra"

The army has to-day about 500 planes and the navy about 100 less. Japan to-day constructs her own planes—in addition to importing various types from Europe and America—in five plants. These are the Kawasaki Dockyard, Kobe; the Mitsubishi Dockyard, Nagoya; the Nakajima Airplane Works, Kobe; the Tokyo Gas and Electric Works, Tokyo; and the Aichi Watch Manufacturing Works, Tokyo. Another interesting fact about Japan's airplane industry is that all foreign instructors have been dismissed, and aviation, both in the army and navy, is being taught by Japanese.

Principal Types of Planes

The principal types of machine used by the army are the Nieuport 24 and Heriot 14 for training purposes. Some Farman 60 planes for bombing and Nieuport 24 and 29 for fighting purposes are also used. The type of motors principally used are the Le Rhone, 124 horse-power, and Salmson, 235 horse-power. The Hispano Suizo, 300 horse-power, has just been chosen as part of the standard equipment and will gradually replace the Le Rhone. At the moment, according to experts, there is not a single high-powered plane among the regular army equipment.

The navy has a larger variation of planes than the army. The lighter-than-air division of the navy is keenly interested in rigid airships. The current year's appropriation for army aviation is 20,000,000 yen and for the navy 18,000,000 yen.

Plans for Air Mastery Guarded

There is a veil of secrecy drawn around Japan's efforts to master the air, but this secrecy is to hide the lack of air power rather than to conceal any degree of efficiency or preparedness.

The general public in Japan is sadly indifferent to aviation. Time and again efforts have been made to arouse them from this lethargy, the most recent being when crack machines of the army and navy joined with civilian airmen in treating Tokyo's millions to air stunts, nose-diving and an air raid on Tokyo. The public, however, regards aviation surely as the province of the army and the navy—and even in the army and navy aviation still stands for something yet in the experimental stage, something vague and undeveloped.

The first commercial air route in Japan was opened last week when private machines, backed by the Government, flew to Osaka, and then to Fukuoka, from Tokyo, carrying a small quantity of mail. It is hoped to make this air mail service first a bi-weekly one and then a regular daily affair. No night flying has yet been done in Japan except for very short distances.

Three Big Training Schools

There are three big aviation training schools in the country. One is at Tokorozawa, which teaches piloting and mechanical training. The course is an eleventh month one. Then there is the school at Shimoshizu, where a six-months' course for scouting and air tactics is provided for. Lastly, there is the school at Akeno, where bombing and firing is taught.

Japan has six aviation battalions, posted in various parts of the country (one in Korea). Each of these battalions possesses its own independent equipment. In addition, a special balloon corps is stationed at Tokorozawa.

The naval aviation department is made up of four naval flying corps, with a total of 3,000 men. Their training takes place at the Kasumigaura aviation station and varies but little from the army training. Foreign teachers were used also here during the first few years.

Cost of aeroplane production is extremely high in Japan, partly due to excessive cost of material and partly due to the high cost of skilled labor. Construction costs in several cases have turned out more than 100 per cent. in excess of the figure at which the same plane could have been purchased direct from the original manufacturer abroad. But in this instance national independence is placed above the thought of economic gain.

No "all-metal" machines are as yet built in Japan, but as plenty of aluminum can be found in the country it will only be a question of time before duraluminum planes will be constructed there.

No Record Flight Made

The Japanese aviation corps have no records to their credit, neither in regard to distance nor altitude. In fact, any attempt of record flying is strictly contrary to military rules. Only recently several attempts were made of an army flight from Tokyo to Seoul, a distance of about 900 miles. The flight did not succeed. The machines were forced down repeatedly, due to motor trouble. A special test of civil aviators also took place, during which successful candidates were to receive their diplomas, but not one succeeded in passing the simple tests prescribed. The courage and nerve of Japanese aviators is beyond criticism. Military strategics show that last year both army and navy men flew an aggregate of 35,029 hours, with accidents limited to one smash-up to 110 hours' flight, and one killed to every 2,000 hours' flight. These figures compare favorably with the fatalities of other nations.

The visits of the British, American, Italian, French and Argentine aviators to Japan in their round-the-world flights have aroused great enthusiasm in that country. With a desire to emulate these exploits, the *Osaka Asahi* and the *Tokyo Asahi*, who have contributed so much towards the advance of aviation in Japan, have determined to repay these visits and arouse further interest in aviation by organizing a flight by Japanese airmen to Europe. The two machines to be used for the flight are the Breguet 1922, the same machine Captain D'Oisy used in his visit to Japan. They are equipped with Lorraine-Dietrich 400-h.p. engines. The *Asahi* aviators are to fly from Tokyo to Paris, visiting the other capitals of Europe.

The *Asahi* newspapers are to be congratulated on their splendid work in encouraging the science of flying in Japan. These newspapers are the pioneers of civilian aviation in their country, and it is not too much to say that they have contributed largely to the present development of the science in Japan by inviting, as far back as 1911, an American aviator to come to that country and do exhibition stunts.

The next year the *Asahi* invited Atwater, another American birdman, to the shores of Japan and staged sea-plane exhibitions at Nishinomiya, near Osaka. In 1913 the *Osaka Asahi* invited to Osaka Koha Takeishi, who had studied the art of flying in the United States for many years, and he tried the first city-to-city flight in Japan. Although Takeishi met with an accident at Kyoto and was killed, his brilliant work greatly stimulated the interest of Japanese youth in aviation and brought many young aspirants into the profession. In 1914 and 1915 the *Tokyo Asahi* and *Osaka Asahi* gave strong support to the aviation tournaments held under the auspices of the Imperial Aviation Association. Both the *Tokyo Asahi* and the *Osaka Asahi* invited Niles, an American aviator, to Tokyo and Osaka in January 1916, and Art Smith, a star birdman from across the Pacific, in the spring of the same year. Both of them staged looping-the-loop and fancy night flights. Since then these two newspapers have done their best to promote the interests of the Japanese people in aerial enterprises by means of lectures and motion pictures, and presented condolence gifts to the relatives of those who have sacrificed themselves in flight, thus paying tribute to the daring aviators. The *Tokyo Asahi* and *Osaka Asahi* had the honour of being the first newspapers to use aeroplanes as conveyors of news matter, news photographs, extras, etc., beating their rivals many times. These two papers, realizing the vital relations existing between the newspaper business and aircraft, inaugurated in January 1923 regular bi-weekly flights between Tokyo and Osaka, a distance of 440 kilometres. At first they used Hall-Scotts of the Nakajima type, with 150 horse-power engines, but recently they purchased a half-dozen Salmsons, each equipped with an engine of 230 h.p. The aeroplanes with the mark of the *Asahi* have been seen between the two great cities of Japan so often that the distance covered by them up to this time amounts to about fifty thousand miles. The true value of the regular flights was amply proved during the great earthquake, when every other facility of transportation and communication was utterly disorganized by the quake. The *Asahi* aviators brought the first photographs of the *débris* and the first details of the great disaster out of the devastated areas, and the details of the calamity were cabled to the London *Times* and the Associated Press of America at their request. The *Tokyo Asahi* and the *Osaka Asahi*, besides running the regular flights and making air trips whenever there was an incident or accident worth reporting, have joined hands with the Japan Research Laboratory of Aerial Transportation, the Aviation Corporation and many other similar organizations, and have done their best to raise Japanese civilian aviation both on land and sea from the state of infancy to its present state. The *Asahi* sister papers, not satisfied with pioneering the conquest of the air in Japan, have now carried out the flight to Europe.

Another Proposal

Haakon H. Hammer, the Arctic explorer, who has been visiting in the Far East, recently wrote a description of the proposed northern flight. Mr. Hammer's article deals with the subject from the European standpoint:

The primary object of this flight is not, as many appear to believe, to reach the North Pole, but to fly over and explore the million square miles of unknown territory located between the North Pole and Alaska. The exploration of this territory will solve the last geographical problem the world has to offer, and as all previously attempted explorations of this area by ship or by dog sleighs have proven futile, it is believed that aeroplanes or airships are the only means with which this problem can be solved.

The flights made from Spitzbergen towards the North by the Hammer-Junkers expedition in the summer of 1923 definitely proved the practicability of aeroplanes for exploration work. This expedition might be called the "experimentary" or "preparatory" expedition as it was on the basis of the experiences of this expedition that the detail plans of the big Trans-Polar flight were laid.

Just what will be found in the unknown Arctic territory cannot possibly be foretold, but prominent scientists are of the opinion that a large continent is located there. Should this be true, the value of such a continent is problematical, but that it will have a tremendous value as an air base for a Trans-Arctic air route is a foregone conclusion.

When discussing the future of a Trans-Arctic air route, it must always be remembered that there is permanent daylight in the Arctic regions between May and September and that the temperature during that period averages from 40 to 44 degrees F. The supposed extreme cold exists only during the winter months, and during the summer the atmospheric conditions for flying are ideal.

While the plans of the expedition so far have been limited to a flight from Spitzbergen to Alaska, I am now endeavoring to make arrangements to secure the additional equipment necessary in order to make a flight from Spitzbergen to Japan with Alaska as the one and only stop for refueling.

The duration of such a flight would be about 36 flying hours and should be accomplished within a period of two or three days. Such an attempt should command the keenest interest in this country.

The distance to be flown would be about 3,400 miles, not much longer than the distance across the American continent from New York to San Francisco. The distance is no obstacle, and after the flight has been made once and the condition of the territory becomes known, it should be simple to operate a regular Trans-Arctic air route during the four or five summer months.

No other country will benefit nearly as much from such a Trans-Arctic air route as will Japan. Such a route will shorten the distance between Japan and Europe by several thousand miles. It would bring London to within a three-days' distance of Tokyo. A visit to Europe and return could comfortably be made in from one to two weeks. From this it will be seen that the opening of a Trans-Arctic air route would not only be of immense strategical but also commercial importance to Japan.

The Trans-Polar Flight expedition is not a national undertaking, but a strictly international effort for the purpose of geographic exploration. That its results, if successful, should develop into a regular Trans-Arctic air route would simply be a natural trend of the progress and development of the world.

A Study in Extraterritoriality

(Continued from page 547).

Ostroumoff and his colleagues, when giving their evidence, denied all the accusations brought against them, and handed the court numerous copies of documents to prove the statements they had made. And this, though so far they have been denied the right to have access to the archives of the Railway Administration to get hold of original documents that are most important for the defence.

The case is a long way from being over, though ten hearings have taken place, for apparently the presiding judge is bent on drawing the case out as long as possible. The sessions are short, never more than three hours, and often much less, whilst they do not take place daily, it taking exactly one month to hold the ten sessions. Another difficulty is that the prosecuting attorney may at any time make additions to his accusatory act. This means further delay, for the production of new documentary evidence on the part of the prosecution will mean that the defence will require time to study these in order to give an intelligent reply.

When Ostroumoff took over the railroad he founded the Economic Bureau to institute an organization for compiling the necessary basic information for the planning of the railway's work. He at once introduced a new tariff policy on the railway, reducing the former tariff rates, which were absurdly high, and enabling native carts to compete successfully with the railway on the southern section, and also to create new transportable commodities by taking advantage of the economic resources of the country.

The following figures show the growth of the commercial transportation :

1920	102,286,613 poods
1921	126,149,526 ,,
1922	151,605,404 ,,
1923	171,153,044 ,,

Extraordinary efforts were needed for getting the rolling stock in good order again. The following table shows the improvement brought about :

	Locomotives		Passenger Coaches		Goods Cars	
	1921	1924	1921	1924	1921	1924
In service and re-	256	181	178	252	9,667	7,208
serve ..	97	280	57	206	—	4,348
In bad order ..	152	72	278	153	2,536	647
Percentage of bad order stock to effective number	30.3	13.5	54.00	25.00	20.8	5.3

In the Traffic Department the following improvements were made. The commercial speed of freight trains was increased from 12.78 versts an hour in 1920 to 17.10 versts in 1923, and the commercial speed of passenger trains from 21.75 versts an hour in 1920 to 33.36 versts in 1923, whilst passenger trains obtained a maximum speed of 77 versts an hour in 1923 against 65 versts in 1920. There was likewise a great increase of the make-up and weight of trains. The average make-up of 67.5 axles in 1920 was increased to 100 axles in 1923, whilst the maximum weight of trains of 60,000 poods in 1920 was raised to 115,000 poods in 1923. At the same time traffic department expenses were reduced from 4¾ millions in 1920 to 2½ millions in 1923.

The property of the Railway, which is looked after by the Maintenance of Way and Works Department and which includes the track, different buildings and construction, and open yards, fell into a state of complete decay during the war and civil commotion. The total length of the railway is 1618.4 versts of main line, and with inclusion of sidings 2,702.8 versts. A space more than 200,000 square sagens (a sq. sagen equals 49 sq. feet) is covered by civil constructions, representing 125 sq. sagens per one verst of track. No other railway in the world possesses such a number of civil constructions. During the three years 1921 to 1923 the Ways and Works Department has not only effected repairs and restored all essential elements of the track, whereby it has been possible to raise the speed of trains to 77-80 versts an hour, but it likewise repaired all damaged buildings and accomplished a number of new works involving a sum of over six millions; the signalling equipment has been improved, wooden bridges replaced by bridges of a permanent type, and car-sheds and other large-size buildings have been erected.

Japan Competes for India's Textile Trade

Indian trade statistics for the eleven months ended February 1925 have just been published. They show that the imports of cloth from the United Kingdom (grey, bleached, and colored) amounted to 1,449,000,000 yards, an increase on the corresponding eleven months of the previous year of 265,000,000 yards. During the same period the cloth imports from Japan were 138,000,000 yards, an increase of 26,000,000 yards. These figures show that the increased trade done by Great Britain with India in cloth was nearly twice as much as Japan's total cloth trade with that country. With regard to yarns, however, Japan has undoubtedly made a good deal of headway. She has exported to India over 30,000,000 lbs., in comparison with 19,000,000 lbs., whereas the United Kingdom has sent only 19,000,000 lbs., as against 20,000,000 lbs. in the corresponding period of last year. The main cause of this is Lancashire's higher cost of production.

New Shallow Draught Oil Tanker for Chinese Trade

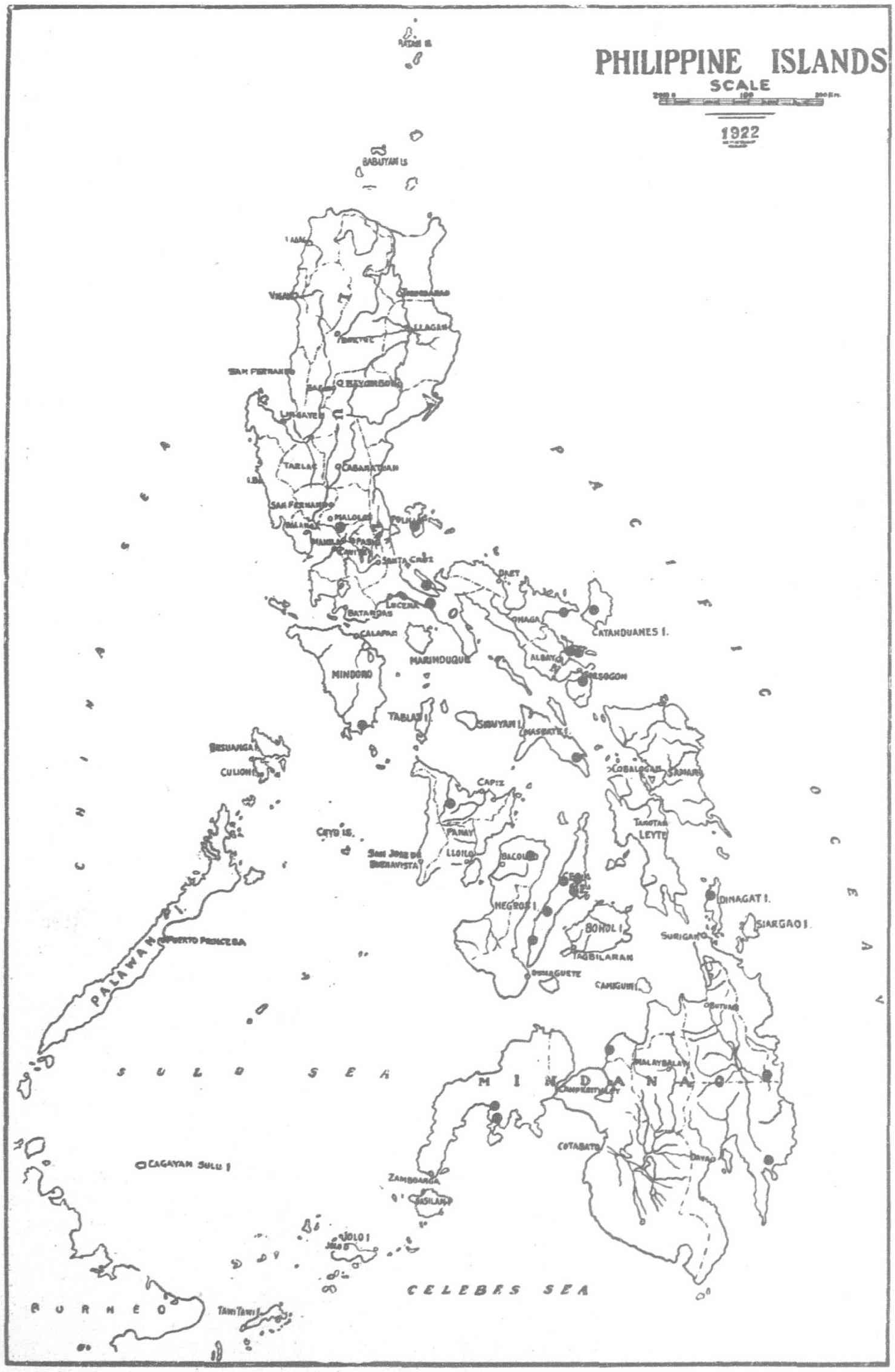
A very interesting launching during the month was that of the *Tien Kwang*, which vessel Messrs. Yarrow & Co. have built for the Anglo-Saxon Petroleum Company, for service of that concern on one of the great rivers in China.

The vessel is a sister ship to the *Shu Kwang*, also built by Messrs. Yarrow for the same owners. They are shallow river oil tankers of about 206-ft. long and fitted with machinery of 3,500 horsepower. They are also fitted with the latest type of Yarrow oil-burning boilers. Formerly it was usual to send vessels of this type in sections to their destination to be re-erected there, but the *Shu Kwang* was sent to the Far East under her own steam, and the *Tien Kwang* will shortly be ready to leave the Clyde for China, and will also come out under her own steam.

Coal in the Philippines

By Warren D. Smith

COAL and coke are needed in the Philippines for making steam, for cooking, for smithing, and for the manufacture of cooking gas and producer gas. The annual domestic production of coal amounts to 60,000 tons, approximately, and a larger amount is being imported. In 1920 imports, from Japan, Australia, and China principally, amounted to 531,550 tons. Until the entrance of the United States into the World War, coal production in the Philippines had nowhere been conducted very successfully over any considerable period. War conditions gave coal mining in these Islands a great impetus, and under favorable conditions it may remain an established industry. With the manufacture of iron and steel from the large deposits of iron that are known to exist in the Philippines, which may be soon undertaken, there will be given an added stimulus to the coal business.



Coal in the Philippines

There is some coal on practically every large island of the Archipelago, but there are six localities of first importance, namely, Batan Island; Gotas-Butong, Dumanquilas Bay, Mindanao; Cebu Island; Polillo Island; Mindoro Island; and Masbate Island.

Batan

Batan Island is 15 kilometers almost due east from Legaspi, in Albay Province, which in turn is a part of the long irregular arm of south-eastern Luzon. The island is from 15 to 20 kilometers long and 8 to 10 wide. It has an irregular coast-line and, for its small size, is very mountainous; one peak attains an elevation of approximately 500 meters.

The formations are an igneous base of diorite; some serpentinized intrusives; the remnants of an iron formation; coal measures, including shales, sandstone, and coal seams; and at least two horizons of limestone, the upper one of which is rather coralliferous (Malumbang Pliocene)—in fact, it is quite probable that a coral limestone covered the entire island at an earlier time. The coal beds are inclined at various angles, often steep, and in some cases vertical. At the points where they can be most easily reached from the seashore the beds unfortunately dip into the island, thus necessitating hoisting and pumping. At eastern Batan there is a local down-faulted block of coal which has a slight dip to the sea. It is this block of coal that is being mined by the Philippine Coal Mining Company. There are at least two good seams of over 1.5 meters, and one or two more of uncertain thickness, which can be easily reached, almost at sea-level.

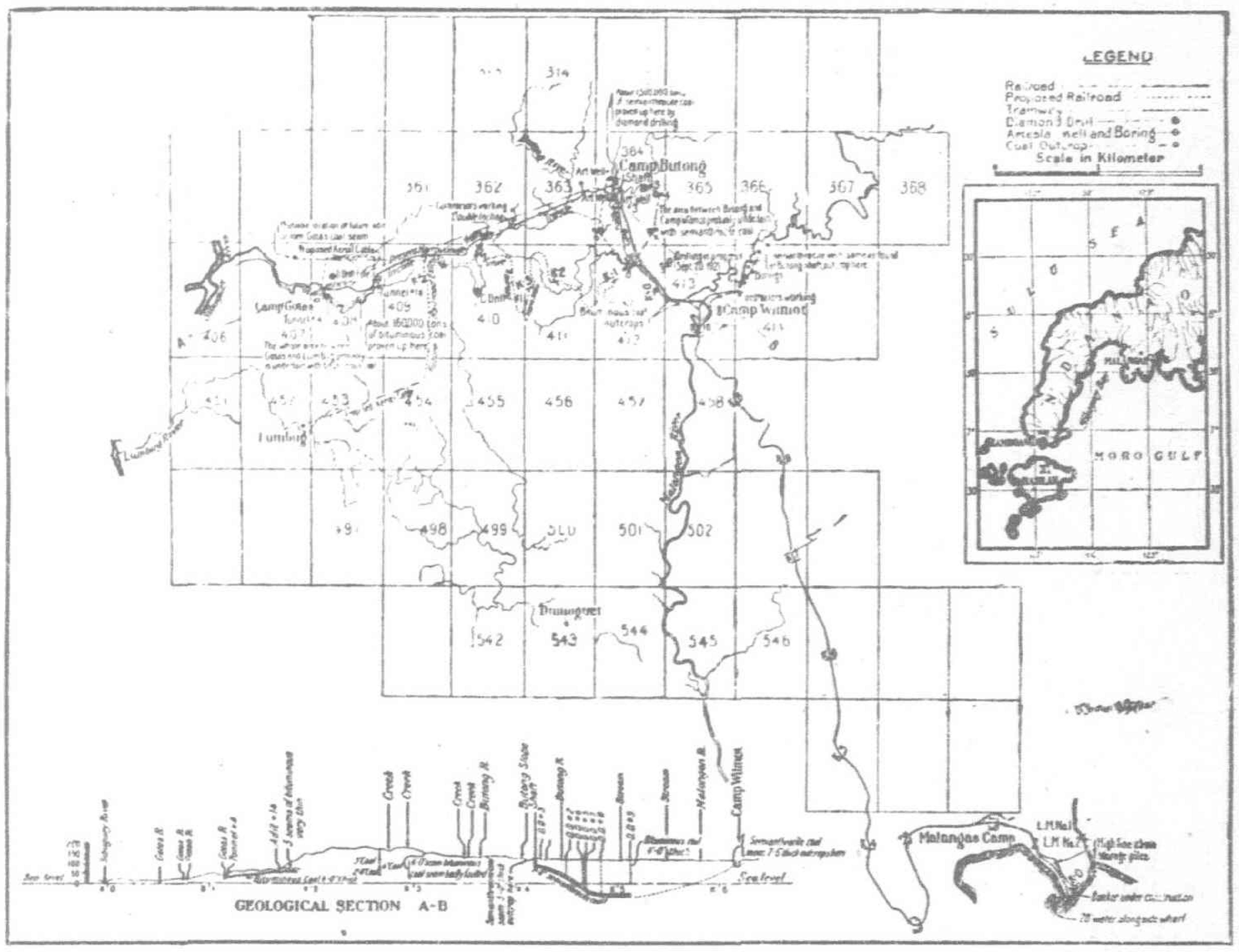
From 1904 to 1910 the United States Army attempted to open and operate a coal mine on the west end of this island, at the sitio of Liguan; but, owing to difficulties, partly geologic and partly of a business nature, success was not attained, and the then Secretary of War, Jacob M. Dickinson, closed the mine in 1910. A private enterprise has recently renewed operations in this locality. The coal at Liguan is, as will be seen from an inspection of Table 29, superior to most Philippine coals. It is greatly to be regretted that this mine did not prove a success in its initial undertaking.

The old Minas de Batan properties on the north-eastern portion of the island (Calanaga Bay) were abandoned years ago. For several years a Spanish company employing Japanese miners, who used rather crude and wasteful methods, operated these properties, but production never amounted to much.

On the east end of the island, near the old barrio of Batan, there have been several attempts at mining since 1907 with more or less success; and to-day, after several ups and downs, the Philippine Coal Mining Company is operating there successfully and producing between 200 and 400 tons per day, which is the largest production in the history of coal mining in the Philippines. The output is by no means steady, as it depends upon a fluctuating demand.

As yet not much trouble from gas in the mines has been experienced, and naked lights can be used, in spite of the fact that the coal is rich in volatile matter. In places, especially in eastern Batan, the coal contains considerable resin and sulphur. There is also some iron pyrites in the shale just above and below the coal, which causes the coal to take fire if it is not thoroughly cleaned or if it is allowed to stay too long on the dump. In 1905 I visited the old Bilbao property, on the north side of Batan Island; at that time the tunnels were abandoned because of spontaneous combustion in the workings. These points are mentioned in detail, not to present too discouraging an outlook, but so that investors and engineers may not enter the field with high expectations which experience with the facts will prove unfounded.

Batan Island is well situated, being directly in the track of steamers coming from San Francisco by way of Guam, the most direct route to Manila. A coaling station here would save the Army transports the long northward trip to Japan, where they now go to coal. On the other hand, it is off the track of many of the inter-island trading vessels and large European tramp ships that touch at Cebu, Iloilo, and Manila.



The Sibuguey Coal Field, Mindanao

Cebu

Coal in the Philippines was discovered in 1827 on Cebu. Cebu is the second district in importance in the coal industry; although the mines located on this island are not the largest, there are more of them, and the coal reserve there is greater than on Batan. Cebu is a long, narrow, mountainous island, with no navigable rivers, few bays, and but little wide coastal plain.

Geologically, many of the formations on Cebu are similar to those on Batan; there are also crystalline schists, volcanic flows, and old slates, all of which may yet be found on Batan, however. In two respects Cebu differs greatly from Batan. It is badly deforested, as compared with Batan, and there is over the greater portion of Cebu a thick mantle of coral limestone, which has been cut through here and there by erosion, revealing the coal measures below. The coal measures are of the same age as those of Batan. Structurally, the island is badly faulted and there is more or less intense folding of the rocks, which makes coal mining difficult.

Scores of outcrops are known in at least fifteen localities, which are distributed from one end of the island to the other. The chief localities to which attention was paid by the Spaniards are to-day receiving the attention of Americans. All but one of these localities are on the eastern side of the central cordillera.

In the early days a great many claims were staked out in this field, but only a few were ever patented. At the present time it is necessary to secure leases from the Government, as patents on freeholds are no longer issued.

Cebu is the headquarters of the National Coal Company, which has workings in the vicinity of Mount Licos, 15 kilometers west of Compostela, the site of rather extensive workings in Spanish times. To date this mine has not been particularly successful. In reality, the only property which approaches a real mine is that of the Mount Uling Coal Mining Company, situated about 12 kilometers west of Naga.

Cebu has the distinction of being the one island, in addition to Mindanao, where coking coal is known to exist. A seam about half a meter in thickness occurs at Guila-Guila, on Mananga River, about 5 kilometers west of the city of Cebu, on the property of Mr. Eugene Mitkievicz. There is also some coking coal at Mount Uling and on Toledo River.

Four principal coal seams which, more or less modified, can be identified in several localities, are known on this island and at Mount Licos; they were given in Spanish times the following names:

4. Pilarica.—1.4 meters; strike north 23° east; dip 30° south-east; 40-meter interval.
3. Enrique Abella.—1.2 to 1.5 meters; strike north 23° east; dip 40° south-east; 9-meter interval.
2. Esperanza.—50 centimeters; strike and dip same as No. 1; 40-meter interval.
1. Carmen.—1.6 meters thick; strike north-east and south-west; dip 30° south-east. This is the lowest.

Some small undertakings for the exploitation of coal at Mount Uling, Mount Licos, and Camansi were in progress prior to 1898, and a large project with Government backing was in process of formation just at the outbreak of the insurrection in 1896. This project was to have been under the supervision of Abella, the then Inspector de Minas of the Spanish Government, one of the ablest of the Spanish engineers in the Philippines and certainly the most competent geologist.

The property of the Danao Coal Mines, Limited, located at Camansi, Cebu, which mined several thousand tons in 1920, has recently been taken over by a large syndicate of foreigners in China, and it is expected that they will carry forward the work on a large scale. The seams in this field are continuations in part of those at Licos and of the field to the north.

In the field adjoining on the north known as Cajumay-jumayan, careful estimates by the late Benjamin Smith Lyman, a famous American coal engineer, who examined it in 1907, gave the workable coal reserve as at least 7,000,000 tons. In this field the coal seams lie in a syncline; elsewhere in Cebu they are generally in a monoclinal attitude.

Sibuguey Peninsula, Mindanao

The Sibuguey Peninsula coal field is perhaps experiencing the greatest amount of development of any of those named, as the principal holdings of the National Coal Company are located there. Coal is known in many places on this peninsula. The principal sites are Gotas, on the head waters of Siay River, 4 kilometers west of Butong; Butong, about 12 kilometers from the town of Malangas; and Camp Wilmot, about halfway between Butong and Malangas, on Dumanquilas Bay. Along a line running across the peninsula from Malangas to Sibuguey Bay scores of coal outcrops can be seen.

The most extensive report on this region is a manuscript report by Dalburg. I recently made an investigation of the properties on this peninsula at the request of ex-Governor-General Harrison and, later, of Governor-General Wood, but my work covered principally the business aspects of the operations. Therefore, the following description is based in part upon Dalburg's report, and is supplemented by my recent observations.

The most important districts are Butong and Gotas. Butong is first on account of the railroad line nearing completion to that point, which will assure means of transportation; Gotas is second in importance on account of having a fairly large body of coking coal. There is a possibility that the best part of the coalfield lies just north of Gotas and Butong, which can only be proved by underground development.

The coal-bed sections show that there are at least three coal beds of sufficient thickness to be mined. At Butong, the main seam (semi-anthracite) is over 2 meters thick. The principal seam of coal at Butong is a semi-anthracite, which owes its high fixed-carbon content to local metamorphism by dikes and sills of andesite and basalt. A characteristic physical feature of this coal is the crystallization resulting in columnar jointing.

The physical and chemical properties of the coals are such as to make them suitable for fuel; they could be used instead of foreign coals and could compete favorably with them. The coal from the Butong seam is too hard to be used alone, without forced draft, and should be mixed with other coal.

Geologic conditions are such as to render mining somewhat difficult, but it is probable that some of the seams are of sufficient extent to allow of successful mining. Diamond drilling during the last year has proved that there is a fine body of coal in the vicinity of Butong. The main shaft for all the mines will be located in a basin to the east of the present exploratory shaft at Butong. The development of this field has not been altogether without mistakes, and some expenditures were made here before they were justified; but it is expected that the mining operations at present in progress will go forward now and produce better results.

At the time of my last visit to this mine (December, 1921) the work in the Butong district was progressing favorably, and a good thickness of coal, in excess of 2 meters, continues. The development work at Gotas has not been pushed, owing to lack of rail facilities, though this work may later be resumed. At Camp Wilmot there is a small production, and development work continues. The work in the Sibuguey field is under the very able superintendence of Mr. Caldwell, an English mining engineer, who had had five years of coal-mining experience at the Silompopum mine in British North Borneo before coming to the Philippines.

Polillo

Polillo lies off the east coast of Luzon, about due east of Manila, is about 50 kilometers long by 25 kilometers wide, and is separated from the mainland by a channel 30 kilometers in width. This coast of Luzon is very sparsely settled.

The principal coal-field lies a few kilometers inshore from the town of Burdeos in the eastern central part of the island, on Burdeos and Aloeon Creeks. The central part of the island is igneous, with granitic rocks resembling diorite, and on the flanks of the igneous complex are Tertiary sediments, with conglomerate, sandstone, shales, and limestone, in the order named, from below upward. Practically the same series of formations occurs here as in the other coal-fields of the Islands. Structurally, there is one well-marked anticline and syncline with two monoclines, with the general axis north 20° west. Moderate and perhaps major faulting is in evidence. The age of the coal is middle Miocene. There are three well-developed coal seams; respectively, 1.5 meters, 0.6 meter, and 1.2 meters in thickness; others are too small to be worked. The principal coal seam is the Wray seam. It was named after its discoverer, Captain Wray, formerly of the Philippine Scouts. There is no development or mining on Polillo at present (June, 1921). Formerly, there was some prospecting work at the so-called Wray mine, on Guinibauan Creek. The following is a copy of notes made by me while on the ground on my last visit in 1910. As there has been practically no work since, these notes are up to date:

"*Quality of Coal at the Wray Mine.*—Upper portion, shiny black, powder black, lower portion dull, brownish black, resembling 'bone'; fine, angular, shiny particles cemented in a coaly matrix. Fairly free from clay or sand; 2 to 2.5 centimeters sooty clay parting between the two portions. No sulphur visible, some gypsum. Fairly firm for outcrop coal, lower part of seam exceedingly hard and firm. It is reported that this coal does not air slack. A large lump that has been in the division of mines for five years has not slacked at all. (At present, seven or eight years later, it is still firm and solid). No well-defined cleats; slickensides or shear surfaces characteristic. Does not coke. Good steaming coal. The coal-field is bounded definitely on the west by volcanic rock. The coal-beds do not appear to be continuous in north and south direction; witness the almost entire absence of outcrops in the north branch of Guinibauan Creek. The seams are flattening toward the coast, and will be found there in all probability of inferior grade to the more highly inclined seams to the west."

The folding in this region was due to lateral thrust against an abutment of resistant rock, the igneous complex in the center of the island. There are no indications of intrusions.

Given continuous seams, which will have to be proved by more excavations, there is nothing prohibitive in the geology. Mining operations will, however, not be simple.

This coal, it can be seen, is of very fair grade. The chief factor that militates against it as a commercial proposition is the geographic situation of the island, as it is well off the track of inter-island steamers. Some years ago there was much talk about developing a port for Manila on the east coast of Luzon, just opposite Polillo Island. This, of course, would have boomed Polillo coal. The project, however, has never advanced beyond that stage. The field was examined some years ago by Mr. J. B. Dilworth, of Philadelphia, then in the employ of the well-known American coal expert, D'Invilliers; in an article on Phillippine coal fields in 1908, he had this to say on Polillo coal:

"All practical and laboratory tests of this coal show it to rank in quality with the best in the Philippines. It is the equal chemically of that from western Batan, and is but little inferior to the Japanese fuel now on the market. But in this field, as in western Batan, geologic disturbances have rendered the coal seams structurally difficult to mine economically on a large scale."

Masbate

At two places on Masbate fair coal seams have been found. These are near Cataingan and Dimas-Alang, near the lower end of the eastern prong of the island. The deposits have been known for a long time, and some attempts to mine coal there were made in Spanish times, particularly on the old Spanish concession containing two *pertenencias* known as the San José and the Santa Cruz.

There are practically no published data with reference to these deposits, but in 1910 Ferguson made a private report from which I have taken some very general notes. The reader will understand that this report was not meant for publication, and Mr. Ferguson has not since examined the region nor had a chance to make any changes in the report as originally submitted. Therefore, I alone am responsible for the following interpretation of his statements. Inasmuch as I later visited a portion of this field I am in a position to substantiate Ferguson's statements of fact and of opinion.

The principal deposits are located near the barrio of Nabangig. It was Ferguson's opinion that there are three main workable seams of coal in that locality. The three workable seams are each approximately a meter in thickness, and they dip very steeply to the north-east, though there are some local departures from this. The coal measures are comparatively closely folded, with one well-marked anticline and syncline. Some faulting was noted, but the most serious feature of the field in the places examined by me was the lack of persistence, the coal thickening and thinning within short distances, in some places disappearing entirely, due either to pinching or to faulting.

Ferguson considered the coal to be of good quality. Some coking coal was noted by him at Dimas-Alang, but for several reasons was considered valueless. No work has been done in that region since the propsecting work which called for the report made by Ferguson. An analysis of the coal from one of the best seams is given in Table 29.

Transportation to a shipping point might be provided by a tramline about 15 kilometers in length through country which, according to Ferguson, offers no considerable topographic difficulties. Port Cataingan, he thought, would be the natural outlet for this coal. Good timber in sufficient quantity is found in this region. Labor is moderately cheap when available, though the gold mines in the Aroroy district absorb most of the local supply. The geographic situation appears to be the chief favorable feature of this field.

Mindoro

At the southern end of Mindoro, near Bulalacao, are some deposits of coal of medium grade which have long been known and where some development work was done in Spanish times. I visited this locality in 1910, but was unfavorably impressed with both conditions and the quality of the coal.

The thickest seam of coal is 7 or 8 kilometers up Bulalacao river. It is 4 meters (approximately) in width. An analysis of coal from this field (not from this particular seam) is given in Table 29. Early reports mention at least six seams, but I doubt that there are more than three or four that are workable.

On Semirara, a small island directly south of Mindoro, there are also coal seams, undoubtedly the continuation of those near Bulalacao. About the year 1893 title was issued for a mine on Semiraral, but I know nothing of its development. The Recoletos Fathers also had some coal properties there, but apparently nothing was ever done to develop them.

Coal deposits of seemingly commercial possibilities, in the following five localities, have attracted attention from time to time; they will merely be listed here, but the interested reader can find some reference to practically all of them in Burritt's Coal Measures of the Philippines. These are Alabat Island, off the north coast of Tayabas, Luzon; Dinagat Island, off the north coast of Surigao, Mindanao; Escalante, on the north-east coast of Negros; Catanduanes, north of Batan Island, off the east coast of Luzon; and Gatbo, Sugod Bay, Sorsogon Province, south-eastern Luzon.

Chemical and Physical Characters of Philippine Coal

Philippine coal is of three chief classes; namely, semi-anthracite (hard coal), sub-bituminous (black coal), and lignite (black and brown coal). The following data with reference to the character of Philippine coal are taken from notes by Dalburg, with some revisions:

Much of the lignite coal is black and very seldom shows a woody structure or brown color. The coals that slack or crumble on exposure to the air break with an irregualr fracture, which as a rule does not conform to the bedding planes or cleats.

The lignites are found where the rocks are little disturbed and away from the lines of uplift. The sub-bituminous and bituminous coals occur near the bases of mountains or where the lateral disturbances and pressure which folded the formation have made a great change in the character of the coal.

Philippine coals are generally non-coking, although fair coking coals have been found at Gotas, Mindanao, and Guila-Guila, Mount Uling, and Toledo, Cebu.

The coal will generally stow about 48 cubic feet to the ton. It is friable, and a large percentage is small or broken. Unless carefully fired a portion only is consumed and the rest goes through the grate bars. In some cases the ashes may be fired twice and still contain a considerable amount of combustible. An important question is the proper spacing of the grate bars, which should not be over 0.75 inch apart. The coal is very gaseous, and it is almost impossible to insure complete combustion in an ordinary type of boiler furnace. Firing lightly and almost continuously insures the best results.

Recent tests on a German gas producer have shown the coal to be suitable for this purpose.

Considerable difficulty is experienced in storing the lignite coals, due to spontaneous combustion.

The fuel value of the best Philippine coals is from two-thirds to three-fourths that of the best Cardiff coals and very little short of that of the Borneo and Japanese coals.

Table 29 gives the analyses of representative Philippine coals. These analyses were made by the "smoking off" method in which the coal is subjected to a low heat so as to expel the volatile matter with a very small flame and finally heated for seven minutes over a Bunsen burner.

The sampling was done according to the Bureau of Science method, which is practically the same as that of the United States Bureau of Mines.

The results are given on an air-dried basis, at laboratory temperature (30° C.).

Coal Seams and Inclosing Beds

In general, there are four workable seams in most of the fields, though in practically each only one seam is being mined. Some of the drill records show more than four present in some localities.

On the United States Army Mine Reservation near Liguan, Batan Island, drill hole 4A, beginning at about 200 feet elevation, gave the following record of the strata:

TABLE 30.—*Strata from Drill Hole 4A on Batan Island, from above downward.*

Material.	Feet.	Material.	Feet.
Shale..	20	4. Coal	6
Grit (coarse SS) ..	8	Shale	2
1. Coal	3	5. Coal	1
Shale..	10	Shale	1
Grit	10	6. Coal	1
Shale..	5	Coarse SS	10
Grit	24	7. Coal	4
Shale..		Shale	32
2. Coal	2.5	SS (?)	
Coarse SS	10	8. Coal	5
3. Coal	2	Shale	20
Shale..	30	Limestone, bottom of hole	15

An examination of these records, which, I regret to say, are not altogether accurate, reveals several important facts; namely, (*a*) that there are at least eight seams of coal on this part of Batan Island, four of which are workable; (*b*) that these beds are not persistent; and (*c*) that shale forms the floor and coarse gritty sandstone the roof.

Drill records from borings on the property of the National Coal Company at Butong, Sibuguey Peninsula, show the presence of sills of igneous rock intercalated with coal measures, which may account for the anthracitization of the coal in this locality. One of these sills is very persistent and is found in the same relation to the chief coal seam in several of the borings. The following is a copy of the record of bore hole 4:

TABLE 29.—ANALYSES OF PHILIPPINE COALS.

Analyses frm the Bureau of Science, Manila.

Air-dried basis.	East Batan.	Liguan.	Calanega.	Camujumayan.	Camansi.	Mount Licos.	Uling.	Bulalacao.	Cataingan.	Polillo.	Sibuguey. Butong.	Sibuguey. Gotas.
Proximate analysis:												
Moisture	18.32	5.81	13.28	12.49	7.49	8.10	14.90	17.57	4.87	3.76	2.05	1.25
Volatile matter	36.53	39.39	39.10	41.63	44.18	40.73	38.63	42.43	46.50	43.58	12.95	18.57
Fixed carbon	36.60	49.71	39.13	42.41	43.90	48.21	41.91	31.49	44.18	38.60	75.60	73.72
Ash	8.55	5.09	8.49	3.47	4.43	2.96	4.56	8.51	4.45	4.06	9.40	6.46
Ultimate analysis:												
Sulphur	1.03	0.12	1.93	0.65	2.40	0.42	0.35	2.54	—	0.32	0.71	0.71
Hydrogen	5.32	5.08	11	—	5.11	5.72	—	5.87	—	5.54	—	—
Carbon	51.55	68.14	—	—	66.18	66.46	—	52.60	—	70.47	—	—
Nitrogen	0.92	1.11	—	1.64	1.72	2.10	—	0.96	—	1.59	—	—
Oxygen	32.64	20.56	—	—	20.16	22.34	—	29.52	—	18.02	—	—
Calorific value determined:												
Calories	4,618	6,358	5,221	5,761	6,249	6.424	—	4,959	—	6,775	7.730	7,730
British thermal units ...	8,312	11,444	9,398	10,370	11,284	11,563	—	8,926	—	12,195	13,775	13,914
Calorific value calculated from ultimate analysis:			%									
Calories	4,603	6,386	5,266	—	6,294	6,389	—	5,058	—	6,840	—	—
British thermal units ...	8,285	11,495	9,479	—	11,329	11,500	—	9,104	—	12,312	—	—

TABLE 31.—*Record of Bore Hole 4, at Butong, Sibuguey Coalfield; from above downward.*

Material.	Meters.	Material.	Meters.
Clay		Shale	
Sandstone		2. Coal	0.15
Shale		Shale	
Compact limestone		3. Coal	0.15
Basalt		Shale	
Shale		Sandstone	
Sandstone		Shale	
Sandy shale		4. Coal	1.98
Shale		Shale	
Compact limestone		5. Coal	0.15
Shale		Shale	
Bone with coal parting		Bone	
		Shale	
Shale		Sandstone, bottom of hole	
1. Coal	0.15		

Hole began at an elevation of 108.5 meters.

A generalized section of the stratigraphy in the Cajumayjumayan field, Cebu Island, made by the late Benjamin Smith Lyman, an eminent coal engineer, is as follows:

TABLE 32.—*Stratigraphy of the Cajumay-Jumayan Coal-field, Cebu.*

Material.	Feet.	Inches.
Coralline limestone of unknown thickness, perhaps	500	
Unconformity		
Shales, sandrock and pebble rock ? poorly, if at all, exposed, perhaps	1,200	
G. Coal bed, including shales; average of the eight completest exposures	12	5
Shales, sand rock and pebble rock ? poorly exposed	215	0+—
F. Coal bed, including very little slate, average of ten exposures	4	0
Shales, sand rock and pebble rock, poorly exposed	125	0+
E. Coal bed, including little slate, average of 4 exposures	3	0
Pebble rock, sand rock and shales, much exposed at the Hogback; probably not far from	650	
D. Coal bed, unworkable, without slate or shale, average of 3 exposures	1	6
Shales, sand rock and pebble rock, poorly exposed	65	
C. Coal bed, including slate or shale, average of 6 exposures	7	5
Shales, sand rock and pebble rock, poorly exposed	70	
B. Coal bed, including little slate or shale, average of 7 exposures	11	
Shales, sand rock and pebble rock, partly exposed on Dunga Creek	130	0+
A. Coal bed without slate or shale, average of 2 exposures	7	7
Pebble rock, sand rock and shale, partly exposed on Dunga Creek and northwards, perhaps	800	
D. Sidra's unworkable coal	1	10
Shales and sand rock ? poorly exposed, if at all	130	
Coal traces, 300 yards west of D. Sidra's Shales, sand rock and pebble rock ? poorly exposed perhaps	500	
	3,936	9

Unconformity

Igneous rock rising to unknown heights, exposed, a little, south-east of Mount Lantauan and probably in the western part of the Boy Claim.

We have, then, say 4,000 feet of the coal-bearing rocks hereabouts, with unconformable coralline limestone above and igneous rock below.

In each of the districts of Cebu there is a limestone horizon just above the coal measures and conformable with them, which is very characteristic and which can be used as a datum. This limestone is very compact bluish to buff-colored rock containing myriads of large Foraminifera of the genus *Lepidocyclina*, of which *L. richthofeni* Smith and *L. insulae-natalis* Ch. are the commonest species.

In Mesaba Creek, barrio of Cantobaco, about 0.5 kilometer north of the Cebu-Toledo Road, on the coal land leased by Quintin Rivera and associates, there is a fine section which, roughly, is as follows:

TABLE 33.—*Section in Mesaba Creek, Cebu.*

	Meters.
Coarse, heavy bedded SS	20–30
Lepidocycline limestone	5–10
Sandy shale	1–2
Coal	0.3–0.6
Sandy shale	12–15
Coal	0.3–0.5
Sandy shale, bottom of section.	

At this place the strike is north 40° west and the dip 15° to 20° south-west.

On Catanduanes Island, which is about 30 kilometers north of Batan Island, there is coal which may be the continuation of one or more of the Batan seams, though it is more than likely that the coal on the several islands of the Philippine group were formed in separate basins.

We are indebted to Mr. E. H. Koert for the following section of the coal measures of that island:

TABLE 34.—*Section of Coal Measures on Catanduanes; from above downward.*

	Meters.
1. Sandstone containing marine fossils in lower portion	
2. Shale and "slate"	
3. Coal	5
4. Shaly sandstone, thin layer	
5. Coal	1
6. Blue-yellow clay, probably fire-clay	
7. Iron ore	2–3
8. Tuff, blending into red shale, thickness not given	
9. Sandstone with conglomerate at bottom, thickness not given	
10. Diabase, thickness not given	

In some manuscript notes L. A. Faustino calls attention to the similarity between the Enriqueta seam at Mount Licos, Cebu (whose thickness of 1.2 meters and 5 to 7 centimeters shale parting about 45 centimeters from the roof is similar to the main seam at Camansi, Danao, Cebu) and another one in tunnel 14 at Gotas, Malangas, Mindanao, and the principal seam on East Batan. Owing to the geologic conditions, one cannot be certain that these seams are to be correlated over such distances, but the similarity is suggestive.

Geologic Factors Affecting Coal Mining

Several geologic factors are of extreme practical importance in the mining of Philippine coal, and these are the lack of persistence of the coal, faulting, igneous intrusions and flows, amount of folding, and the age of the coal.

The lack of persistence of the coal seams in many localities has been commented upon by several persons who have studied Philippine coals. The pinching out of the seam just when one is driving ahead and counting on a certain definite and steady output is very disconcerting. Pratt has discussed this subject in a special paper, and I have alluded to it. It appears that the chief reason for such lack of persistence is the irregular deposition of sediment due to torrential precipitation which probably was the rule throughout the whole of Malaysia during the Tertiary, as it is to-day.

In many coal-beds in the Philippines lack of persistence is due to a totally different cause; namely, faulting. However, once the system of faulting in a given district has been learned and the seam been re-located, it is usually found to persist, which is not the case in pinching. Faulting, on both a major and a minor scale, is found in almost every Philippine coal-field. Throws ranging from only a few centimeters to hundreds of meters are known, and such faulting is going on at the present time. Some examples of thrust faulting on a minor scale are known, but most of the faults are normal. In the Uling coal-field this condition is well shown where the Uling Coal Mining Company is mining a block of about 10,000 tons of coal that has dropped down and is practically separated from the rest of the field. The faults can be easily seen in the galleries.

At Licos the Esperanaza and the Enrique Abella veins are faulted in No. 8 tunnel, where there is a displacement of 50 meters and a throw of 12 meters. The direction of this fault is north 65° east. In the old Montanes tunnel a fault was encountered with a throw of 25 meters. Faults of far greater magnitude on this island are indicated by the topography.

The influence of igneous rocks upon coal seams is well known. In the Philippines the coal seams have been intruded and disturbed perhaps more than is at present realized. At Butong, Sibuguey Peninsula, Mindanao, the coal measures have been intruded by dikes and sills of igneous rocks, and in that field a semi-anthracite coal is found. In places completely recrystallized coal occurs, simulating the hexagonal jointing in basalt.

The degree of folding also is very important. Facts in support of this statement need not be reviewed, as they are learned by experience and are discussed in any good text-book. Perhaps nowhere in the Philippines can the effect of folding and the resultant changes be better seen than on Batan Island. On the west end of that island the formations are intensely disturbed, the coal strata being tilted at high angles and faulted as well. In all this crumpling the coal seams have been sheared in some places; in others they have cracked and opened. This has accelerated the process of distillation, which would ordinarily proceed slowly, and as a result the coal near Liguan has a higher percentage of fixed carbon than has the coal on the east end of Batan, where the seams are less strongly folded.

The age of the coal is very important also. It is a common saying among American prospectors that Philippine coal is "too green" to be any good, and this is not very far from the truth. Philippine coal is of Tertiary age, most of it having been formed in the Miocene period of that era, although it may yet be found that some of the lowermost seams are somewhat older. Usually Tertiary coal, no matter in what part of the world it is found, is inferior to coal of Cretaceous, Jurassic, or Carboniferous age.

Most Philippine coals are very similar to the Eocene and the Miocene coals of the West Coast of America, which in turn are decidedly inferior to the Cretaceous coal of British Columbia or the Carboniferous coal of Eastern America.*

It is true, as already pointed out in connection with the Butong coal of Mindanao, that, owing to peculiar local conditions, a high grade of coal (in this case semi-anthracite) has resulted from the metamorphism of Tertiary coal.

It is obvious that four of the geologic factors named above have a profound influence upon the method and the cost of mining. This is well exemplified by the difference in system and cost of operating the mines on East Batan and those on Cebu. Usually, and fortunately so, the commercial value of coal seams is in direct proportion to the difficulty and expense of mining the coal.

Conditions Affecting the Mining of Philippine Coal

There are some factors of importance, aside from those discussed in earlier paragraphs, to be considered in the mining of Philippine coal; these are taxation, regulations, labor, and the paquiao system.

The Philippine Government has in operation a coal-leasing law which in the main is very liberal and under which coal operators can work. The regulations accompanying the law have now been revised. In coal-mining, which is the most difficult kind of mining, Filipino labor has done fairly well. Labor costs differ in the different districts. In general, capataces receive 50 to 75 pesos per month; miners, timberers, wagon men, and outside men, 1.10 to 1.60 pesos per day.

A very important factor in the economical production of coal in the Philippines is the so-called paquiao system, which seriously concerns the coal operator in two ways. In the first place, the paquiao system is a local contract system which is the crudest and most wasteful (a sort of "gophering" along outcrops) with which operators have to compete. Second, this system ruins much good coal-mining territory for future large-scale operations. I have been underground where new development work has run into these old "gopher holes" and have seen the damage, particularly in the rainy season, resulting from this pernicious system.

Steps have recently been taken to curtail some of this kind of mining, but a great deal of damage has already been done. The system has been in wide use on Cebu Island. There are scores of such coal-mining operations on that island now.

Methods of Mining

The common method of mining coal adopted by the larger operators in the Philippines is the "room and pillar" system, but in some of the mines the work follows no regular system. In the Philippine Coal Company mine the seam is so nearly flat that it is very easy to lay out the work systematically and follow it out; but, when the seams become more and more highly inclined, as they do in Cebu, it is not so easy. In some of these properties a system like the "battery" would probably work better. In the flatter seams, like those on eastern Batan, the "long wall" might be the best method, but a bad roof is the chief objection there.

In the paquiao work the Filipino and Japanese laborers simply undercut an outcrop with small Japanese picks until they are either driven out by water or bad air or until the ground caves. They do a certain amount of a poor sort of timbering, which consists merely of a few irregular props.

The larger mines, superintended by white men, are usually provided with good timbering and ventilation. As yet very little undercutting by machinery is employed and only a small amount of shooting coal is done. Many kinds of timber are used, but, owing to the hot and wet condition of most of the mines, *pagatpat*, or mangrove, a very durable wood, has been found the most serviceable.

Preparation of the Coal for the Market.—Modern coal-washing equipment has been installed only at Malangas, on the property of the National Coal Company. At Uling a very satisfactory coal-washing and screening apparatus of home manufacture has been used successfully for a year or so.

Market.—The entire output of Philippine coal-mines is disposed of in the Philippines, the bulk of it being used by inter-island merchant vessels. Some other local uses are found for it in operating hemp presses, road rollers, ice plants, railroad locomotives, etc. That it could be more economically used to a greater degree than at present is indicated by the success attained by the Philippine Bureau of Science, where electric power has been produced by means of a 67-horsepower Otto suction producer-gas plant at 0.03 peso per not kilowatt hour (pre-war figures).

An important consideration in placing Philippine coal on the market is transportation; this is either very poor or absolutely lacking in many localities where a fair grade of coal exists, and inter-island freight rates are exorbitant.

There is no good reason, save high cost of labor, why almost all imported coal cannot be replaced by domestic coal.

TABLE 35.—*Minimum Costs per Ton of Mining and Marketing Philippine Coal and Manila Price of Chinese "Slack" as of June, 1921.*

[Data furnished by a Coal Engineer.]

	Pesos.
Mining	3.00
Freight	5.00
Unloading and stock piling	2.00
Loss, about 10 per cent.	1.00
Taxes	2.00
Total	13.00
Chinese "slack" from Tientsin now selling in Manila	16.00
Margin	3.00

As very few operators ever cut their mining costs to as low as 3 pesos it can readily be seen how small is the margin of profit in normal times. During the war period prices for local coal were inordinately high, owing to the cutting off of the foreign supply, and many persons have unwisely made plans based upon those figures. Needless to say, a rude awakening awaits them. In fact, coal prices have already dropped, and they will continue to do so.

Conclusion.—In conclusion, it may be said with confidence that a good industry can be built up by developing Philippine coal deposits. There are adequate coal reserves, but there are many features which make the business a difficult one. The Filipinos are for the most part more given to agriculture than to mining at present, but the younger generation may take a hand in the mining industry.

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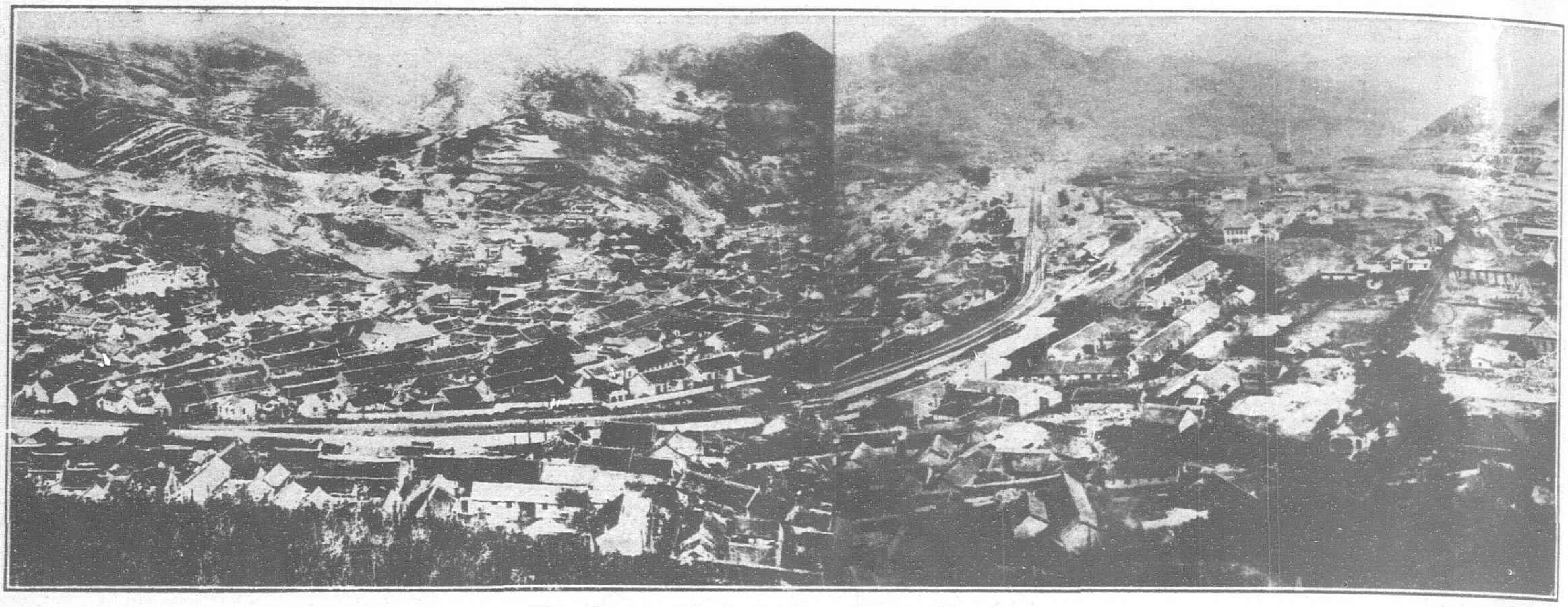
*An exception to this statement has been noted by Doctor Kryshtafovich in the coals of Saghalien Island.



Pen Hsien, a Coal and Iron City in Manchuria

Modern Tendencies in Eastern Steel Markets.

By Sir Edgar R. Jones, K.B.E.

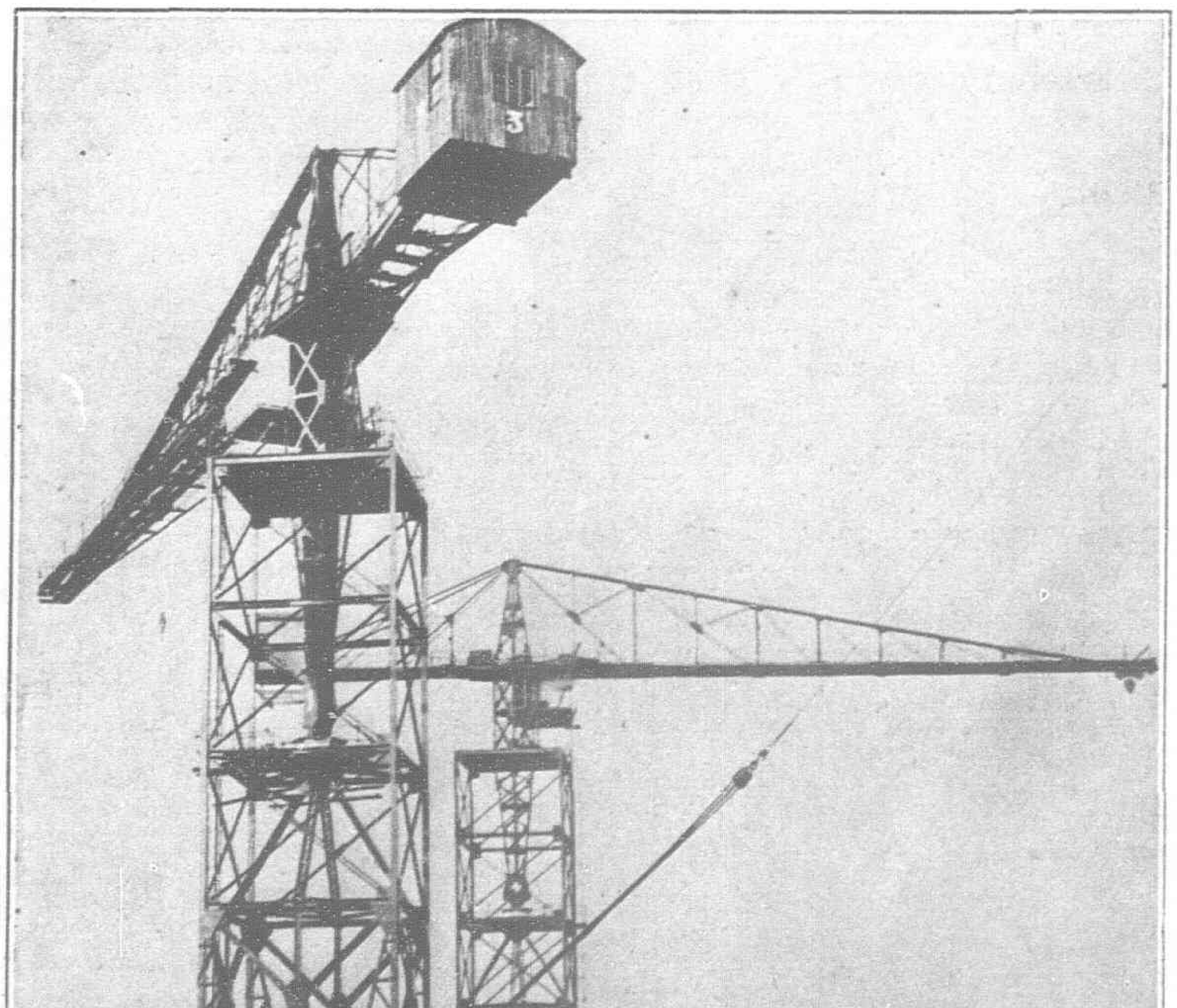
UP to a period a few years before the war, the British steel manufacturer relied upon the quality and the low price of his steel, and because of that, purchasers came to him from all parts of the world, and he did not have to get up an aggressive selling organization to canvass for orders. Since that time America and various European countries have succeeded in producing steel for their own requirements, and become competitors as to quality and price in the general markets of the world. The coming of this competition brought into existence a large number of merchants, who either as sole agents for manufacturers or otherwise, created and maintained connections for canvassing orders for British steel goods.

In the main, that is the organization that exists to-day, although some steel manufacturers have recently set up their own order-seeking organization. The big fact of recent developments is that not only European countries and America have steadily closed up their markets against our products, but India, Canada, Australia, and South Africa have also commenced to produce on a substantial scale for their own requirements. It is inevitable that those Dominions that have been for many years the great markets for our products will in time all follow the example of Europe and America in providing for their own needs. If, therefore, the British steel industry is to maintain its production it must constantly find in the less-developed parts of the world new markets to take the place of the markets that are closing up. It is because there is a prospect of such a great new market in the Far East that one would emphasise the importance of paying serious attention to that part of the world.

Japan

For reasons that will appear, it is advisable to dispose of Japan at once. From the point of view of the steel trade, Japan has practically come into the category of the European markets. She has already 51 blast furnaces and 134 steel furnaces, producing two and a quarter million tons of steel of every commercial form per annum. Up to the present there is a great market in Japan for sheets and tinplates. From America and ourselves she is taking about 250,000 tons of steel sheets, and 70,000 tons of tinplates a year. Not so long ago she bought the sheets galvanised and corrugated. To-day there are 80 galvanising works, and the sheets are taken in the uncoated form as black sheets. Recently they have gone further, and last year they produced over 35,000 tons of thin sheets. Last year further new works were started for producing more of these thin sheets, and unless Britain and America can make it impossible for these works to compete in quality and price in such sheets, it is inevitable that this large market will be filled up from within.

For the present the shutting out of tinplates is not so probable, although a small beginning in the production of tinplates has already been made.



Tower Crane Manufactured by the Kameido Workshop

The Prince Regent at Yawata Steel Work

Not so long ago practically the whole of the sheet and tinplate imports of Japan were from this country, but to-day the Americans are securing almost as much of the sheet business and more tinplate business than we are. The critical question is whether, as a result of that competition, it will or will not be possible for the Japanese firms themselves to fill their own book and shut out both Britain and America. Having put forward those facts, it can be seen that Japan may in the course of a few years become a serious competitor in the great Eastern market that is open to us, but is only beginning to develop.

The main function of this address is to examine the Eastern market, and for this purpose we may lay down the following propositions: (1) We want that market very badly for the next 30 or 40 years; (2) it may grow during that period to be the biggest open market in the world; (3) we can secure and keep that market if we exert ourselves at once in the right direction; but (4) if we drift along the lines of business that now exist we will not get that market. Leaving out Japan, the Far East may be divided into two sections—(*a*) the islands, (*b*) China.

Far Eastern Islands

Included in the first group there is Java, with a population of thirty-six millions, practically equal to that of England and Wales; a rich country, well developed and laid out by the Dutch, with a very industrious population, producing very valuable products in great profitable quantities. There is the enormous island of Borneo, with a population of two millions, and the almost as large island of Sumatra, with a population of four millions; practically empty countries when their population is compared with the size of the area. There are the Malay States, with a population of about three millions, and a large number of other islands with a population of from two millions to five millions. There are also the Philippines, with a population of nine millions, in connection with which there is no need to assume that the Americans will keep the bulk of the trade; and there is French Indo-China, with a population of seventeen millions, where also there will be great opportunities for British trade. And Celebes and New Guinea, with a population of about a million. In the total, a population of over seventy millions. Two facts about that large population are worthy of note:—

In the first place, it is a mistake to minimise its importance by regarding it as an uneconomic savage population. It is to-day nothing of the kind. British, French, Dutch, and American firms have established great companies with enormous capital in these productive districts. Oil, tin, rubber, sugar, coal, tea, tobacco, and many valuable products mount up to a total trade of enormous value. There is room for immense development, and that development is steadily proceeding. Railways, docks, works, new cities are being built, and for them, and for the marketing of the products, large quantities of steel are already being consumed, but this steel consumption is only the beginning, and the market possibilities during the next half-century are very considerable. In moving around these valuable centres of growing industries, one cannot fail to observe the lack of power, system, initiative, and attack by the steel interests of this country. Before the war the Germans showed a great fondness for this part of the world. They are beginning to get back. Is the British steel industry going to drift in an attitude of *laissez faire* and let the Germans get hold of this great prospective market?

In the second place, the whole of this interesting part of the world is being run by Chinese. They are the shopkeepers, artisans, engineers, merchants, and producers. Large rubber factories as well as estates, substantial pineapple canneries and estates, tin mines, and various kinds of plantations have been organized by Chinese business men, who have made already great fortunes by their business foresight, ability, and methods that are not inferior to those of any German-American, or English business man. What, there, fore, is to be said about China has a great bearing upon the whole of those territories, the industrial and commercial matters of which are Chinese, even though the Governments be nominally American, French, Dutch, or British.

China

In China there is to be found one-fourth of the population of the world. The Chinaman has behind him an intelligent civilisation, which in the industrial arts for thousands of years was in advance of the rest of the world. In the extraordinary strength, skill, and patience of Chinese workmen, in the wonderful social and trade guilds and organizations that they possess, in the intelligence, astuteness, and business capacity of its merchants and leading citizens, the population of China can become as advanced and formidable, man for man, with any race in the world.

For historical reasons that are plain, this powerful mass of one-fourth of the world's population has delayed longer than Europeans, Americans, and Japanese in resorting to the methods of modern industry. They have, however, reached the point where it can be said that they have made a substantial beginning. Where there is peace and social order, as in the Treaty Ports for example, in Canton, Shanghai, Pekin, and Hongkong, it is astonishing to see the progress that Chinamen have been able to make. Already the utilisation of steel and all that follows from it has carried them a long way. It is amazing how, in spite of the practical non-existence of a central government, as we understand it, the Chinese business men have been carrying on their industry, so that even last year, in the midst of an appalling state of civil war, the turnover of the Customs revenue was a surprising record. My definite conviction is that in the course of the next half-a-century China will be calling for more steel than any other importing market in the world. To-day the market is fairly substantial; she imported in 1923 over 20,000 tons of galvanised sheets and over 60,000 tons of tinplates. These figures are trivial compared with the figures that will appear during the coming years.

The question is, who will get this enormous business? America is beginning to be a competitor; Japan close by has also commenced. For the moment the bulk of the market, insignificant as it is compared with the future, is in our hands. Here is the greatest opportunity that lies to-day before the British steel industry. Are we going to be equal to it, and are we going to secure it? China will be taking in fifty years' time a tonnage of sheets and plates equal to the whole of our production to-day. Is that tonnage going to be our production? It all depends on the steps taken in organization. If the Americans, or Japanese, or Germans, get ahead of us with the right kind of established organization we shall be out, but there seems to be no reason, except lack of enterprise, why with the initial advantage that we now possess we should not be the first and best organized.

Need for a Selling Organization

That achievement depends upon the clear recognition of certain definite facts: (1) We must recognize that China will never

(Continued on page 570.)

Zinc Metallurgy in Tonkin

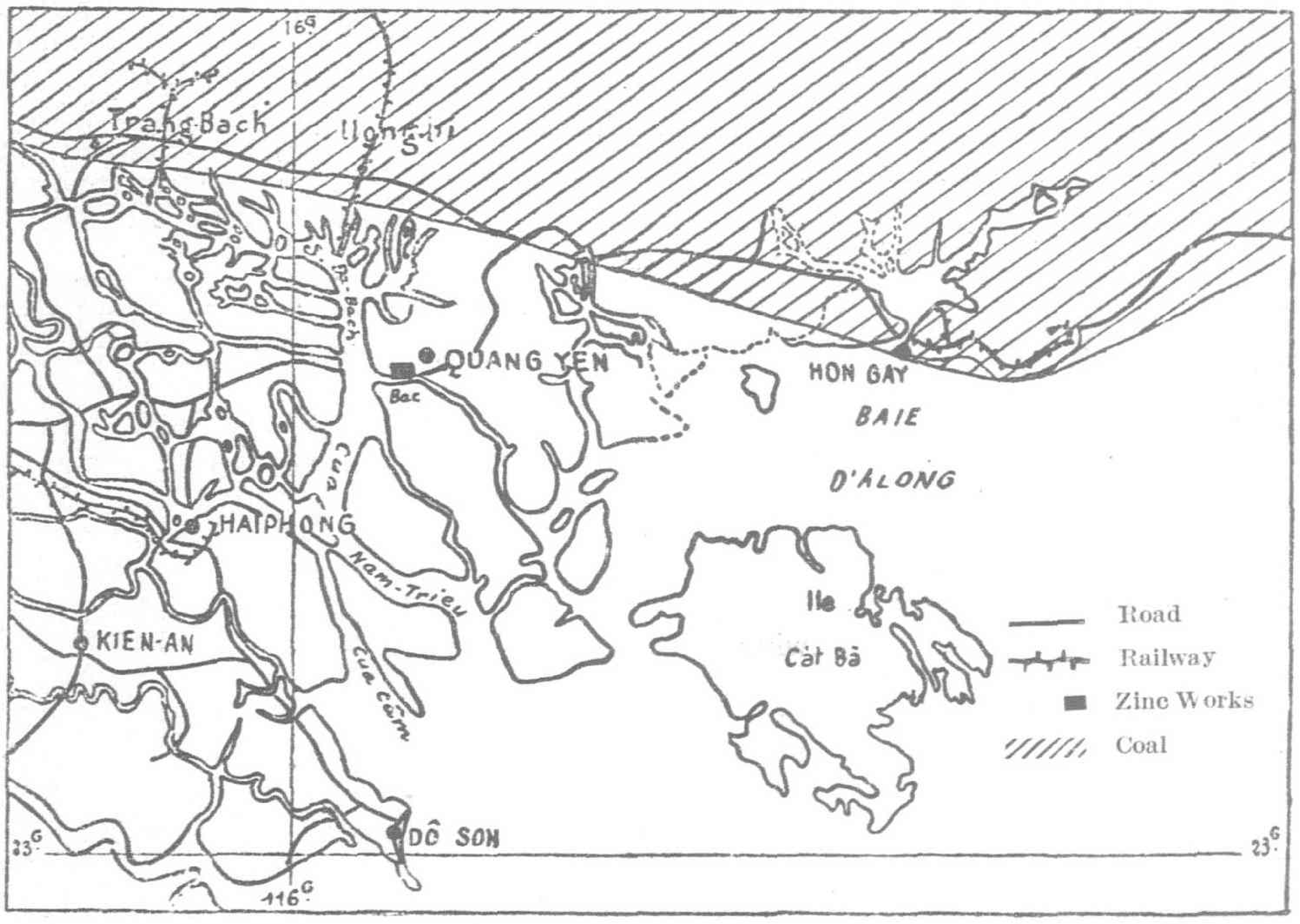
The Zinc Works of Quang-Yen.

By M. Raby, Chief of the Mining Department, French Indo-China

THE Ore and Metallurgic Company of Indo-China was, founded on March 4, 1919, with a Capital of Fcs. 1,600,000 and in 1920 decided to erect at Quang-Yen, a Zinc Works capable of handling, at first, Oxide of Zinc ores. In 1921 the Capital of the Ore and Metallurgic Company was raised to Fcs. 16,000,000.

This Company acquired, in 1920, the property of the rich Zinc mines of Chodion, the honor of their development being due in particular, to Mr. Bault, who invested about a million dollars for the construction of a Railway-Line, 32 kilometres in length, in order to convey the ore extracted from the mines.

The construction of the Zinc Works was commenced in 1921. The following is a description of the different buildings erected, as also the characteristics of the projects of the company, in order to show how much has been accomplished and the difficulties inherent in the establishing, in an undeveloped country of a metallurgic industry as complicated as that of Zinc is.



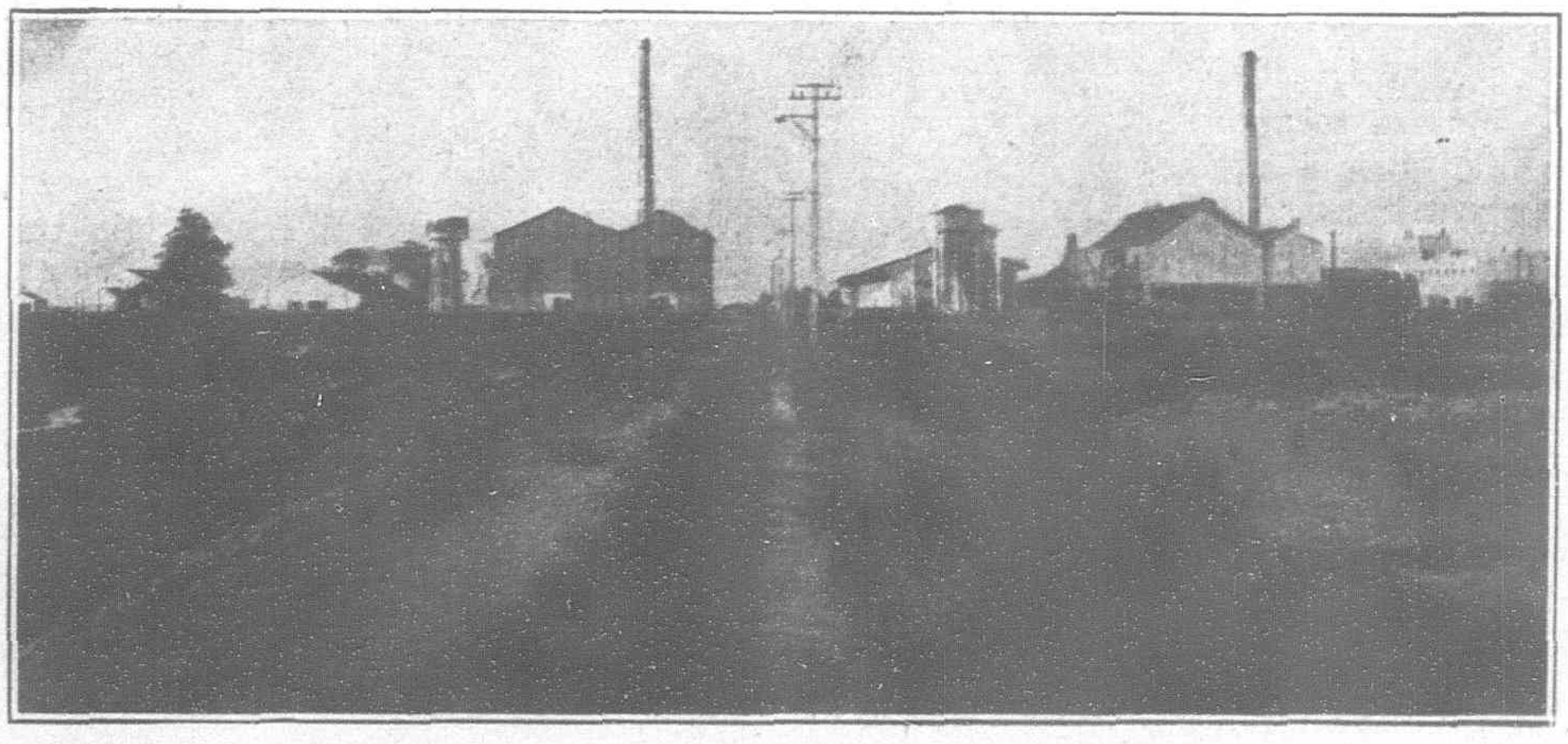
The Zinc Fields

Situation of the Works

The Works have been installed in the immediate neighborhood of Quang-Yen, the capital of a Province in Tonkin, and on the banks of the Song-chang, which is a navigable river, regular communication by small steamers being assured between Quang-Yen, Hongay, Port Wallit and Moncay.

The situation chosen is, moreover, in the South and near the coal region of Dong-triéu and the bay of Along, advantages of great importance in the Zinc industry owing to the great amount of coal required. Anthracite from the coal area mentioned can thus be brought easily and at slight cost, and the Port where the Smelting Works are situated, 8 k.m. only, from the loading Port of the Societe des Charbonnages (Coal - Mining Society) of Dong-triéu and 40 kilometers from the Port of Hongay.

The existence along the Southern side of the Anthracite region of Dong-triéu of a bed of fire-clay, which can be used in part at least, in the making of crucibles and Zinc-condenser is on the other hand very important for the enterprise.



The Zinc Works

Moreover, another very interesting economic factor, in a region where fresh water is scarce, is that the works is easily supplied with water by means of a well, 2½ kilometres distant, where water was reached at 10 metres from the surface.

We will also draw attention to the fact, that the Works being situated at the month of the delta and in a healthy district can easily procure, locally, all native labor necessary.

Projects of the Company

The Works are fitted up to cope with an annual output of 6,000 tons of metal, which will be attained by employing, in the treatment of oxide of Zinc ores, the classical Belgian method of smelting in small retorts.

There will be six Van Gulck Zinc furnaces, fire of which will be constantly in use, each furnace giving 3,600 kilogrammes of metal per 10 tons of ore in 24 hours.

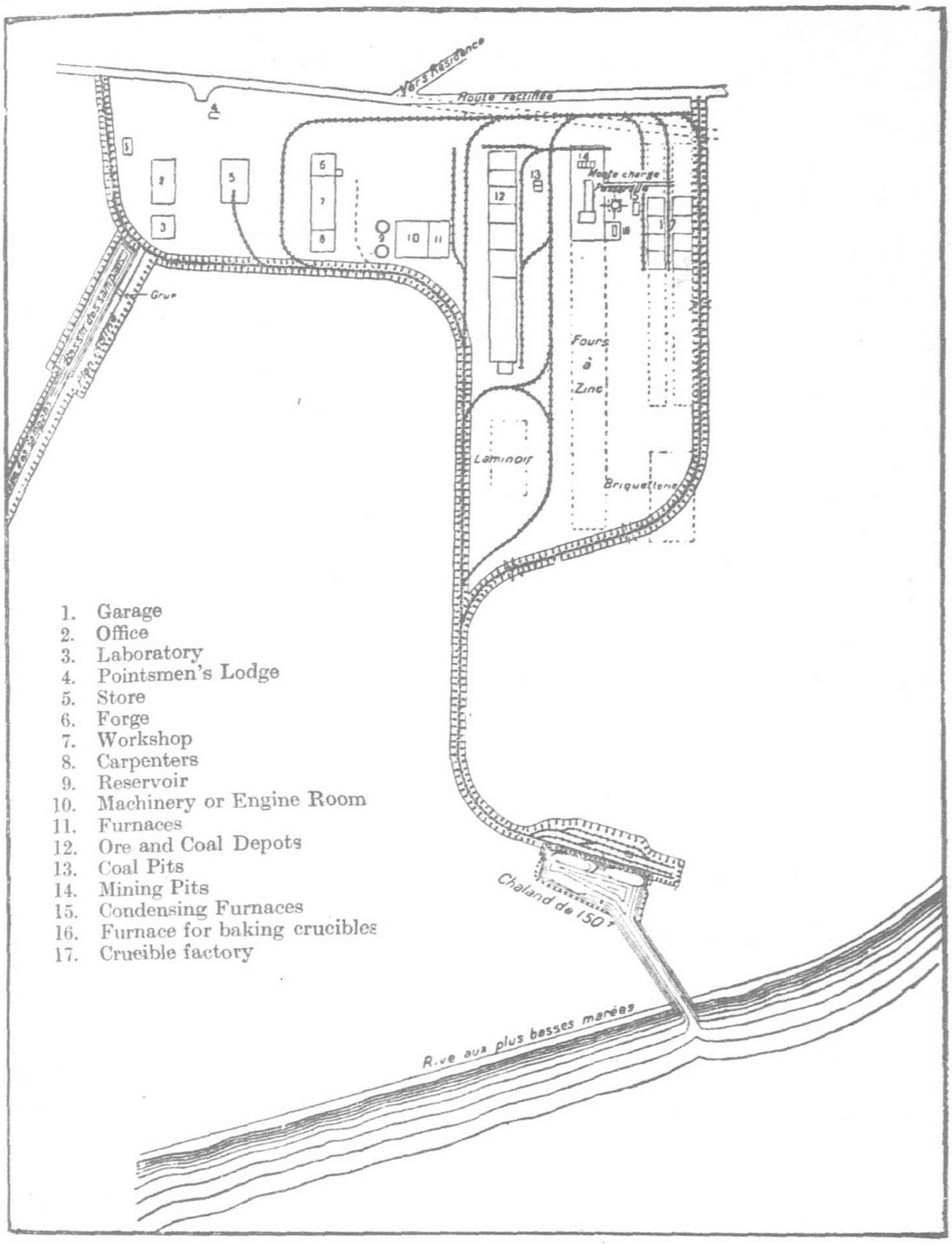
The Works, it is estimated, will need daily 90 to 95 tons of coal as follows:

12% for central consummation
26% for smelting
62% for heating the furnaces by gazogéne.

The first furnace is now finished, as also the greater part of the installations which will allow of the employment of the six furnaces. The Mining Company, will delay the erection of the five other furnaces until they have brought to the desired point the smelting of the metal, and the training of the native workmen by means of the present furnace.

The project which is being carried out, has in view, moreover, the construction at a later date of Zinc rolling plant, consisting of a reducing-roller and two finishing machines (train finisseurs), the installation being capable of reducing 3,000 tons of metal per year.

Lastly, it is possible that when the above proposed installations will be in full operation, the Mining Company will consider the treatment of Sulphate of Zinc ores, which will, doubtless, constitute more and more one of the most important industries of Tonkin. A workshop for making blend wire-work, can then



The Zinc Foundry at Quang Yen: Plan of the Plant, scale $\frac{1}{3,000}$

be added to the existing works, the sulphuric gas resulting from the wire-work will be used probably in the production of sulphuric acid.

If the Zinc industry succeeds in the Colony, we can look forward to equally the making of white Zinc and the working of Galena-blend, frequently to be met with in sulphate of Zinc Ores.

The accompanying plan will show the general arrangement of the buildings already constructed. Those intended to be built later on, these latter being designated by dotted lines.

Dock

A basin, 60 metres in length and capable of berthing simultaneously 3 lighters of 150 tons each, has been constructed and linked up with Song-Chang by a canal, accessible at high water, during a period of 12 hours. At low tide there is a depth of 2 metres in the (basin) Dock.

A 2-ton crane facilitates loading and unloading.

The ores which arrive directly by lighter are forwarded at once to the ore pits situated in the Shed H, where are also the coal pits.

Ore and Coal Depot

This building is 110m. by 15m. and is divided by transvers partitions into compartments, into which the materials to be stored are brought by means of small waggons running on an overhead mono-rail, loaded from elevators at the Dock. The taking of the ore and coal for working purposes is done by means of a mono-rail system on the ground-floor of the building, the ore being sent to the crushing works and the coal to the boilers, furnaces or gas works.

The ore crushing installation is situated to the north of Shed H, and consists of two crushers with perforated bottoms, grindstones to crush and sift the ore, two elevators and two hoppers. The installation will be double, and the half which exists at present will suffice for the ordinary output, each crusher being able to cope with 10 tons an hour.

Building for the mixing of Ores and Reducers.

This building, partly underground, is at the extreme north of the Furnace House. The materials, crushed ore and reducing coal (coal dust, 40 to 45 per cent. in weight of the ore used) are brought to the Shed H by mono rail, and poured into the mining-pits, where the mining is done by means of a Campistrou mixer. The resulting mixture is then raised by means of an elevator and poured into a hopper.

Furnace or Retort House

The mixture, spoken of above, is taken at the hopper by small waggons and deposited in a heap in front of each section of a furnace, which is of the Van Gulck regenerator type.

The reducing is carried out in eliptical refractory fire-clay crucibles (the interior axis being 190mm. by 270mm.) having an interior length of 1m. 50 arranged in each furnace at a slight angle on fire-clay supports. The furnace on the first story of the building consists of five independent sections, divided each, into two symmetrical parts and communicating by the top; each half-section opens on a different (back to back) side of the Furnace House, and contains four super-imposed rows of eight crucibles, and thus each furnace contains a total of 320 retorts. These retorts are heated exteriorly by gas generated in the two door gas-generators, placed at the southern extremity on the ground floor of the Furnace House, and fed with into or from the mine of Hongay or the coal mines of Dong-triéu.

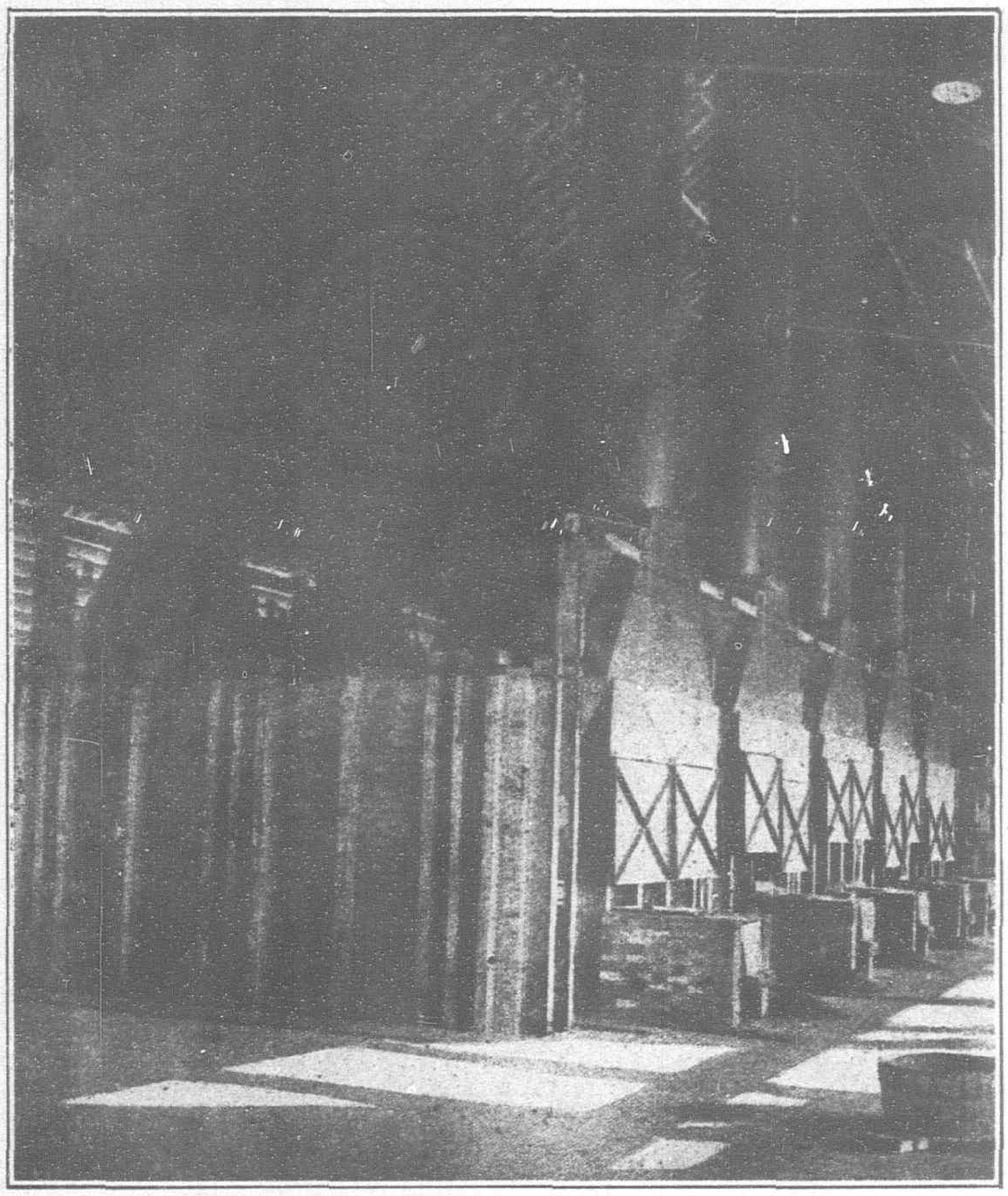
The gas taken in each section in derivation on the supply pipe burns whilst circulating successively in the two symmetrical parts of the section; whilst ascending in the interior of the first, and descending on that of the second; the currents of gas are then directed to the chimney, passing through a saving device which permits of reheating the air to mix with the gas to be burned.

The reduction of the ore being, generally, complete between 1,250° and 1,350°, it is necessary to obtain a temperature approaching 1.450° in the exterior zone of the retorts. The metallic vapours resulting from the reduction, are collected in refractory fire-clay condensers, called "tubes" arranged at the back of the retorts and near the furnace where the temperature is about 500°.

It is in these "tubes" that the workman collected the metal, which he has caused to run into a curved cavities channel, by means of a rake, after having extracted the sheet-iron damper, usually placed at the extremity of the condenser during the process, to collect the residue.

The work of reduction takes 24 hours, and during that time the zinc is extracted two or three times, each retort giving about 12 kilogrammes of metal.

The principal difficulty to be met with in the work is in the handling of the retorts and the arranging of them in the interior of the furnace on refractory supports. The retorts must, in fact, before their introduction into the furnace, be heated red hot in a special furnace situtated near the reducing furnace. They



Van Gulck Zinc Ore Reducers

are then carried to one of the openings of the furnace, and we can easily understand of installing a retort, heated to about 1,000° and weighing 75 kilos, in the exact place reserved for it, a difficulty all the greater the higher the row may be in section. It is also necessary to draw attention to the fact that Annamite labor is less robust than that employed in smelting works in Europe, therefore, the Society adopted, from the outset, retorts weighing 75 kilos, whereas Belgian retorts vary between 50 and 100 kilos.

The empty retorts, once placed in position, are then filled with about 42 kilos of mixture to be treated, and which had been previously piled up in front of each section. This operation needs to be carried out with the greatest care in order to avoid empty spaces being caused between the mixture and the sides of the retort, for pockets of air could then give rise to very dangerous blasts of matter heated to a high temperature.

The loading is done by throwing the mixture by shovelfuls to the bottom of the retort, without leaving any empty spaces, and ramming the whole down if necessary.

When the work has been completed, the cleaning of the retorts is done by hand, a large rake being used to cause the hammer-slag to fall to the floor of the Furnace room, from which it is carried away in small waggons.

A retort is, on an average, useless after being used twenty times only. We can thus understand the necessity of having important works for the making of retorts, and also that the question of having an adequate supply of refractory earth at reasonable price, is of prime importance for this industry.

Retort House

The Drying House already installed off the Retort House, can give an output of 50 retorts per day, whereas the daily requirement of a furnace is but 15 retorts only.

Retorts

The earth utilized in the making of the retorts is, on the average, kept at 10 degrees of humidity, and this is lowered to 1-5 or 2 degrees in the drying chamber, heated by winged radiators through which run currents of hot air drawn from the Field boiler. (Ch.)

After being weighed, this earth is mixed in the proper proportions, and the mixture is passed through a Johnson crushing machine, fitted with grindstones, B, making 15 turns a minute, the bottom having a floor of perforated sheet-iron, pierced with holes, which assures that no mixture will pass through but what is less than 3mm. in dimension.

The crushed material then passes through a noria and disturbing hopper, T, to a mixer where the requisite amount of water is added, and from thence to the working-up machine, M.

The material which comes from the working-up machine contains from 13 to 14 per cent. of humidity, remains for from 10 to 20 days in the chambers a, b, c, called maturing rooms, where a transformation takes place which gives a uniform texture and plasticity to the whole mass which is absolutely necessary for the successful making of retorts.

The matured matter after another kneading in the mixer, M, *transformed by a special vertical kneader into* " balos " or " full cylinders," 58cm. in height by 38cm. in diameter.

A hydraulic press P1, permits of obtaining, at once, from each "balo" of a retort by a process similar to the making of a cartridge shell. Another press P2, similar to P1, will be installed soon.

The retorts are afterwards dried in the chambers situated on the first floor of the building; 15 rooms can accommodate 4,500 retorts. The drying process takes about three months, the retorts during the first month being kept at an ordinary temperature which, during the second month, is gradually raised to $55\frac{3}{4}$ and maintained fairly constantly at that temperature throughout the third month.

The heating is obtained by means of the Simon-Carves method which consists in causing currents of hot air to circulate in the chambers blown in by means of the ventilators V and V1. Nevertheless, the use of this method of heating for the drying of the retorts being new, six chambers are heated by means of a current of vapor, passed through cast iron conductors, winged, situated in the flooring, a method commonly employed in similar installations.

Tubes

The making of tubes which must be submitted to temperatures approaching about 500° only, needs less care and the employment of refractory earth less refractory than that necessary for the making of retorts which have to sustain a temperature of 1,400°.

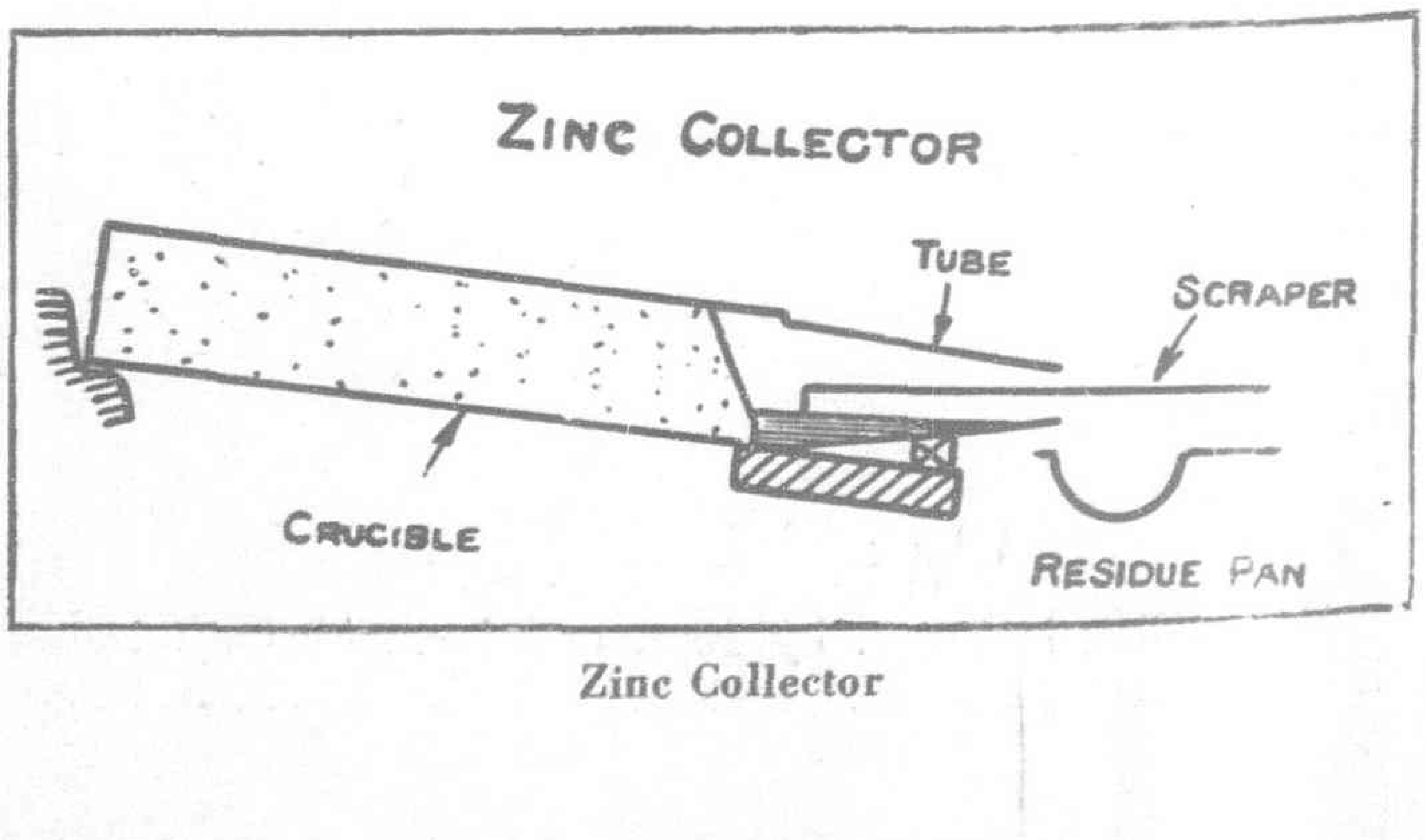
The refractory earths for condensors are prepared by means of a crusher B, a mixer M, and a kneader M.

The tubes are actually made by hand in moulds, the matter being compressed between a fixed truncated envelope and solid cone, which a workman raises and allows to fall alternatively.

Trials are being carried out to use the native workman in the making by hand of inflated tubes whose shape is better adapted for the reception of liquid zinc. The making of condensors, mechanically, by means of the rhenane method is also contemplated in the near future.

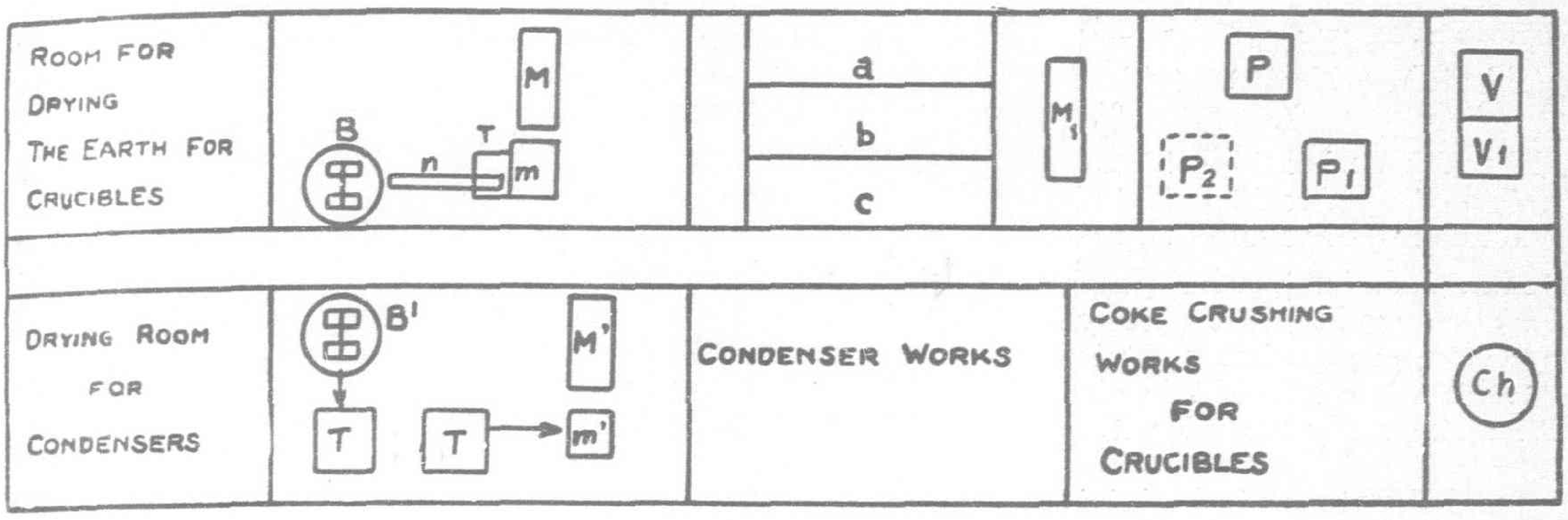
The tubes thus obtained are dried during 15 days in specially heated chambers, heated by means of wing-radiators furnishing currents of vapor.

The study in the laboratory of materials from the abovementioned region allows us to hope for good results, some being sufficiently plastic and beginning to itinerate or soften at about 1,630° only, whereas the most refractory clay used in France and Belgium resist temperatures but slightly above 1,680° to 1,770°.



Zinc Collector

CRUCIBLE HOUSE (GROUND FLOOR)


ROOM FOR DRYING THE EARTH FOR CRUCIBLES
B
T
M
n
m
a
b
c
M1
P
P2
P1
V
V1
DRYING ROOM FOR CONDENSERS
B'
M'
T
T
m'
CONDENSER WORKS
COKE CRUSHING WORKS FOR CRUCIBLES
Ch

Often in Europe are used mixtures nearly of the following composition: 45 per cent. of fresh refractory fire-clay, 45 per cent. of calcined earth or debris of bricks and old retorts, and 10 per cent. of coke.

The Mining Company proposes to utilize several series of retorts made, either solely of fresh earth imported, the cost price laid down at the works not reaching 300 francs a ton, or of local clays in varied proportions costing laid down at the works, but $10 a ton only and having had the necessary mechanical preparation. Graphite coming from Laokay, or imported carborundum are incorporated with certain mixtures in order to study the possibility of doing away with the use of Tonkinese coke, the quality of which is rather variable.

The laboratory experiences having, on the other hand, shown that certain elements which lower the degree of fusibility of the local earth of That-Khe and Dong Linh (Silica, Mica, feldspar) can be easily separated by washing, it is proposed by the Mining Company to install another undertaking comprising cleansing and decantation works in the neighborhood of the retort works, in order to allow of the obtaining of a good quality of refractory fire-clay.

Local refractory clays are exclusively employed in the making of tubes, being mixed in about equal parts with ordinary baked clay. The condensors are cooked, after having been dryed and before being used, in a special furnace.

Central

The motive-power necessary for the adequate running of the Factory is composed of the following:—

2 Belleville Boilers having $105m^2$ of heating surface, with forced draught to 325 and Green economisers.
2 Dujardin horizontal, mono-cylindrical machines of 205 h.p. each.
2 Three-phase current alternators of 200 kw., 500 v 50 periods.
50 kw., at most, will be taken for the electric lighting of the office at Quang-Yen.

The heating of the boilers is effected by using anthracite 0/15 burnt in layers of 10 to 12cm on Gennevey grating, forced draught being used.

Workshop

A complete workshop, installed right from the beginning of the factory allows all the usual works to be carried on, with the exception of moulding. It has two lathes, two boring machines, a planing-machine, a vice-filer, a Mortiseuro.

The principal economic value of the importance of working-up the Zinc ores of Tonkin on the spot, is in the economies realised on transport: transport of material from Indo-China to Europe to be treated, as also of the metal required from Europe to Indo-China to allow of the adequate functioning of the factory in all its branches.

The cost of freight to Europe, etc., in October 1924 was at the rate of 90 francs for ore and 150 francs for metal, which represent, respectively, 15-8 per cent. and 5-6 per cent. of the value of the products at Haiphong, the figure 15-8 per cent. corresponding besides, to a mineral 45 per cent. rich in metal. We can, therefore, see the advantage resulting from the construction on the spot of a Factory. It will become still more important when less rich ores are smelted, the freight for which would then equal 30 to 40 per cent. of the products.

When the whole installation will have been completed, and a Rolling-Mill fitted up, Indo-China consumers will then be able to procure in the Colony the 1,220 tons of metal they need, annually, a quantity based on the average of imports for the four years, 1920-1923, an average which is but slightly greater than that imported before the War: 1,100 tons for the period, 1910-1913.

The figures given below give, on the other hand, the importance of the markets which Indo-China Zinc can find in China and Japan.

The Japanese needs are now more considerable than before the War, the raw-metal worked or contained in ore, attained in fact, an average of 11,670 tons for the period, 1910-1914.

Ores Smelted—Metal Obtained

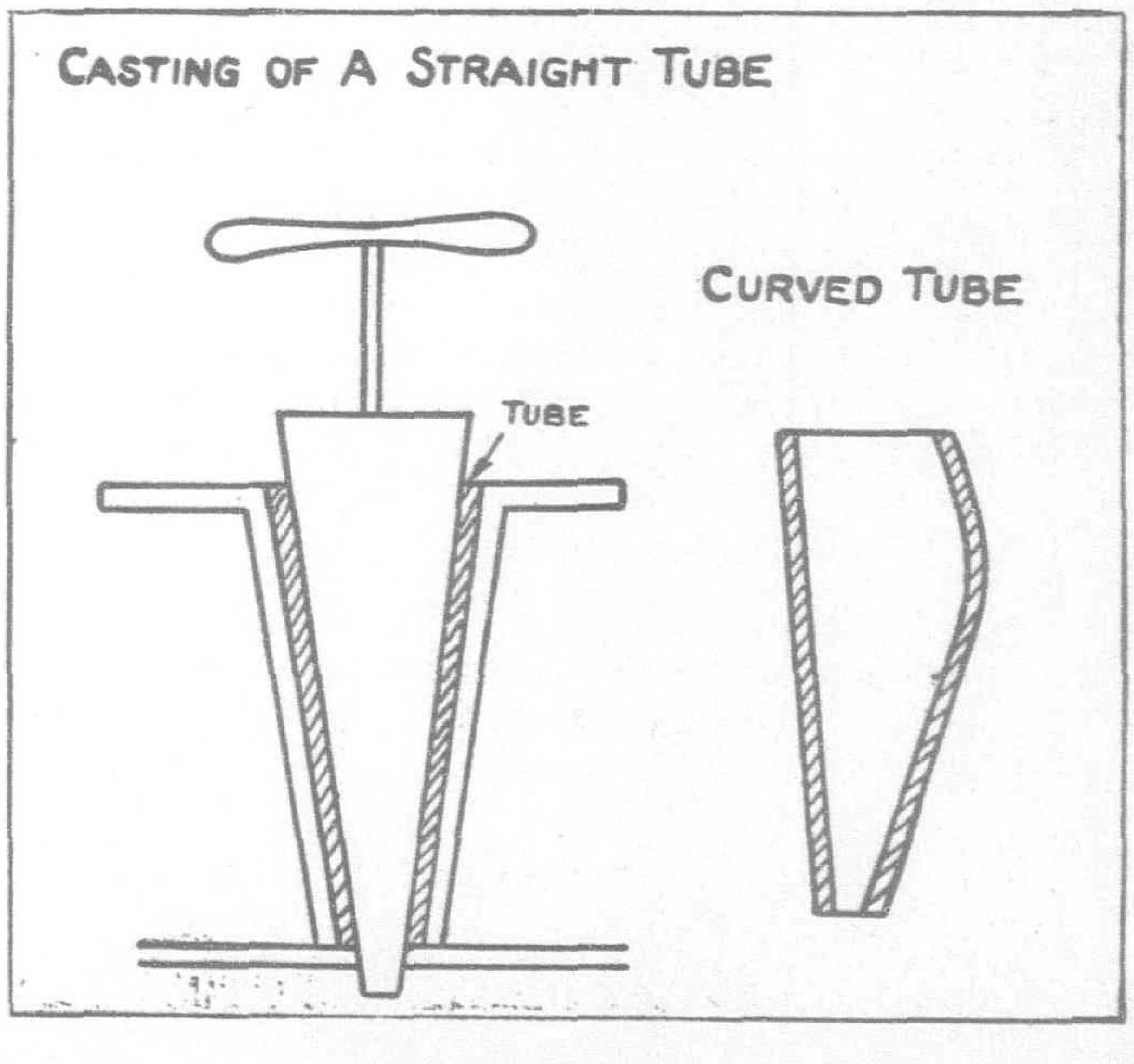
The first ingots of Zinc were cast on the 12th November, 1924. Since then the Company has methodically worked to bring the casting, etc., up to the point desired, as also the training of the native workman. No serious difficulty has been met with. The smelting of the ores from the mines of Chodien has been carried on normally, the proportion of Zinc in the residue of the retorts being quite comparable to similar undertakings, The native labor adapted itself, perfectly to the delicate handling of the retorts, and to the charging of them. Great progress has been obtained since the start in the fixing in place of the crucibles and the luting of the different joints so that the loss through matter escaping, which was rather great in the beginning, has been considerably reduced.

The irregular working of the furnace during the months of November and December, 1924 gave 72 tons of Zinc. Under ordinary conditions the average daily output during the first half of January reached, 2 tons 800 lbs. (fr.)

The Mining Company has been using, from the time the Works were in full working order, the rich calcined calamine earth coming from the mines of Che-dien (Firsts); but it is evident that it will be, above all very interesting to smelt in Tonkin, the poorer ores of less commercial value and enable to bear less than the richer ores, the actual high freight charged.

Therefore, since the month of December the smelting of the poorer kinds of Calamine ores has been carried on, that is those of a secondary order, and in January those of a third class were undertaken. Later on, if need be, the utility of smelting mixtures of different qualities will be considered.

CASTING OF A STRAIGHT TUBE



An analysis of the different elements contained in the ores extracted from the mines of Cho-dien is given below :—

CALAMINE.

	Firsts (Carbonate.) %	Seconds (Silicate.) %	Thirds (Silicate.) %	Fourths (Silicate.) %
Silica	4 to 7	20 to 25	20 to 25	25 to 30
Iron	12 to 14	5 to 7	7 to 12	12 to 15
Zinc	50 to 53	45 to 50	40 to 45	35 to 40

The ores used contain but little Cd. (Cadmium), or Pb, (Lead) : 12 to 0.64 of Pb ; 0.015 to 0.079 for Cd. according to the analysis carried out by the Mining Company of average specimens obtained from First and Second Calamines. This is why we can obtain, direct from the Condensors, a marketable metal ready for use without needing to undergo any refining.

The analysis, carried out in the Laboratory of the Mining Department of a specimen of Zinc, gave the following results :

	%
Zinc	99.50
Iron	0.05
Lead	0.41
Cadmium...	0.02

This metal is therefore classed under the ordinary marks (g.o.b. good ordinary brands) on the London market, or as " Prime Spelter " on the New York market. The " New Metal Exchange " in fact, defines this last quality as not containing more than 2 per cent. of lead and of 0.08 per cent. of iron.

Under ordinary conditions, when the six furnaces will have been erected, the Factory will be able to smelt 50 tons of ore daily and if we admit a yield of 80 per cent. for ores to 45 per cent. of metal, the output of Zinc will total 10 tons a day.

Indo-China, whilst being a Zinc producer, will remain an exporter of ore if the amount extracted from the mines does not diminish.

The amount of ore extracted in 1924, as registered, was as under :—

MINING AND METALLURGIC Co. (Mines of Cho-dien).

Output for 1924	Calamine	24,656 tons
	Blende	146 ,,
Other Mines in Tonkin	Calamine	7,409 ,,
Output for the first half-year of 1924,	Blende	1,429 ,,

Modern Tendencies in Eastern Steel Markets

(Continued from page 565)

become Westernised in the way that Japan has. She cannot abandon her commercial system, because it is rooted in the whole of her social system. (2) The merchanting of British steel must be done through an organization that fits in with the peculiar organization of Chinese life. (3) Drifting along without such an organization is certain to end in abject failure.

It is true that there exist in China many important branches of British merchant firms or many British merchanting firms acting as general agents. I had an opportunity of calling upon most of these merchants in the East, and of discussing the situation with them. There was a striking unanimity of opinion amongst these merchants. As there are so many of them dividing the small turnover of steel business at present, and as the margin of commission or profit which they can add to the price of steel goods in face of modern competition is very small per ton, the result is that it does not pay them to spend money upon seeking such small orders. To put it briefly and perhaps rather roughly, steel orders are to those firms a sideline that does not permit of expenditure for canvassing and selling. Taking that phrase, I again emphasise the serious point that the big future business in China will not be secured if our steel goods are handled as a doubtful commercial sideline. If, however, the whole turnover, even of to-day's tonnage, were handled by one organization, the small percentage per ton permissible for selling costs would be sufficient to provide an aggressive selling campaign. But this question of organization goes further and deeper. After all, the existing merchants are mainly tied by the leg to offices in a few of the Treaty Ports, whereas the immense future business of China will be found far inland.

It is quite common all over China for goods to be transported by vessels of substantial tonnages along the rivers for from 600 900 miles to great cities that are populous centres of industrious provinces ; cities that are great river ports as far from the sea as, say, Constantinople or Moscow are overland from London. The organization suggested must spread into these internal entrepôts of trade, and, as already stated, it must be through, and by, and according to the methods of, the Chinese. There are two or three British firms dealing with other products that have organized on these lines for many years, and because they have done so they have made profits of many millions of money in China, and they are holding the trade position beyond the reach of any late-coming competitor. There will be from now on as great a demand for steel goods as there has developed a demand for other goods, but they must be provided and supplied to the millions of Chinese consumers with similar facilities to those provided by the successful exploiters referred to.

What has been said should make it clear that this situation cannot be handled in a small way with small capital by small firms. Such an organization must of necessity be a large and powerful organization. One cannot believe that the steel trade of this country will let it all go by default. If it is not to go by default one of two things must be done at once ; either the merchants who are interested in Chinese trade should create such an organization amongst themselves, or if they do not do it, the steel manufacturers should create such an organization. If the merchants neglect to do it, then they will have estopped themselves, as the lawyers say, from any fair cause of complaint if the manufacturers are driven to do it, and thus supersede them.

Manchuria Spinning Mill, Liaoyang

THE Manchuria Spinning Mill, newly completed at Liaoyang, of which Baron Ito is President, is the first Japanese plant of its kind in Manchuria. It is now turning out coarse yarns, 16's and 20's. Ten thousand spindles out of 32,000 are being worked, the entire installation being expected to be operated early next spring. In the future finer classes of yarn will be put out. At present the mill employs 700 hands, mostly Chinese, and their number will be increased to about 2,500 in the spring. The expert hands have been trained at a Tsingtao mill allied to the Liaoyang plant. Both Indian raw cotton and native raw cotton produced about Mukden and Liaoyang are used. The native cotton is available only in a limited quantity, but is of splendid quality. The new mill covers 20,000 *tsubo* of land, but another 30,000 *tsubo* is held for future extension.

The mill is capitalized at Y.5,000,000, half of which has been paid up. Its shares number 1,000,000. Construction work was begun last June, on a site west of Liaoyang, the cost amounting to Y.3,000,000. Machinery has been imported from England, and the looms from Nagoya, Japan. The power required by the plant is 1,300 h.p., wholly supplied by the Fushun Collieries. The installation of machinery has progressed to the extent of 90 per cent. When the mill is operated to its full capacity, 3,500 or 4,000 hands will be employed. The working gang includes only 70 Japanese. The Chinese laborers in Manchuria come mostly from Shantung. They used to be easily recruited, but there is now more difficulty, and the labor problem is pressing. The apprentices range from 15 years to 20 years in age, but in a sparsely-peopled country like Manchuria the hiring of so large a number of young Chinese is a matter of much difficulty.

As to the output, when completed, the mill will manufacture about 3,000 bales of 16's a month. As regards cotton cloth, the chief products are grey sheetings. Jeans are also manufactured, the daily output being 700 rolls.

Native raw cotton has been found to be satisfactory, as raw material, both the black and white species, are suitable. The black species have longer and soft fibres. The Chinese make no distinction between the two species, and grow them together, and this often causes a lack of uniformity. Liaoyang raw cotton used to be employed for stuffing quilts, and it is only in recent years that it has come to be turned to spinning account.

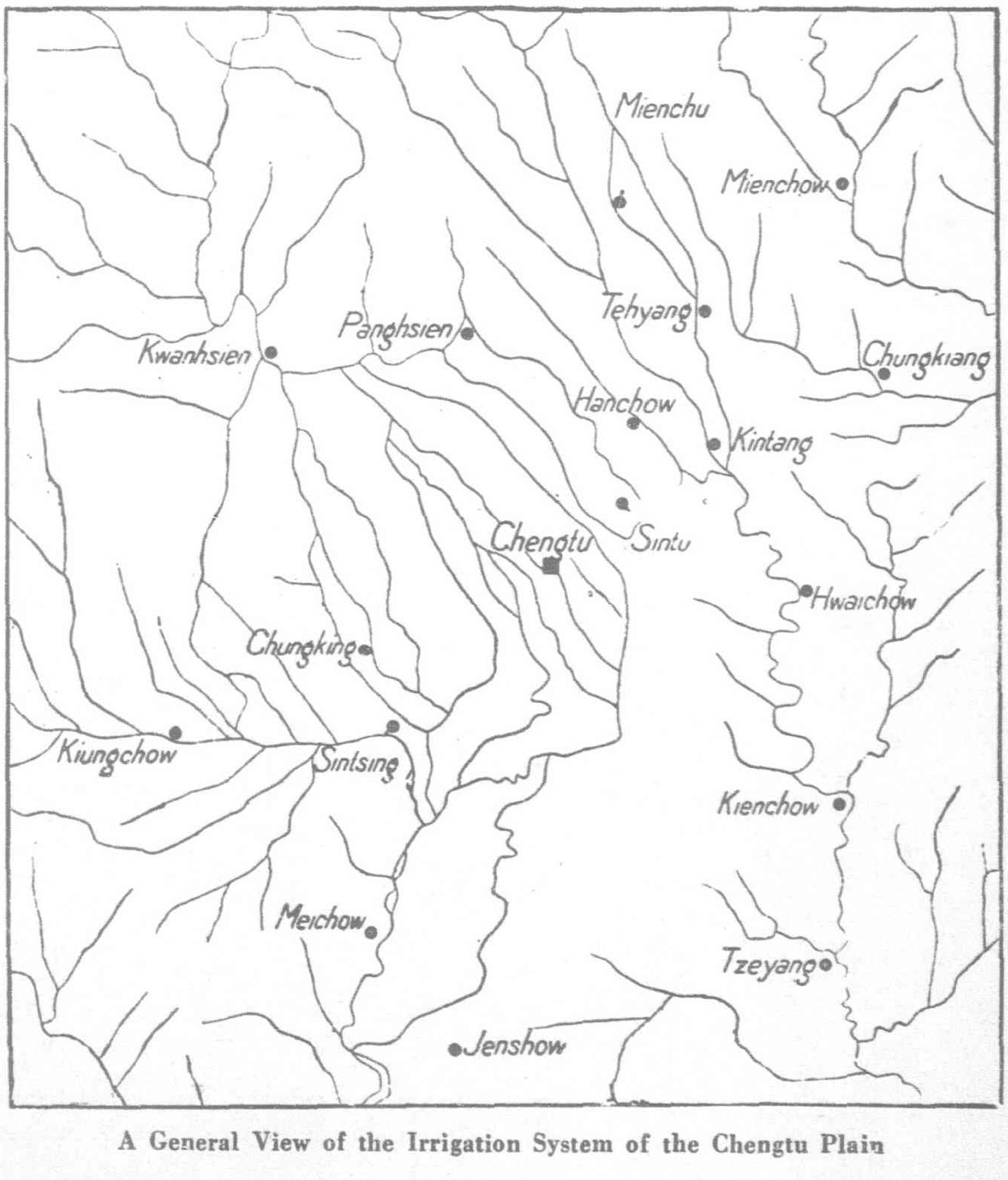
Capital Dam of the Chengtu Plain Irrigation

FOREIGN TRAVELLERS in Western China never cease to marvel at the system of irrigation of the Chengtu plain, Szechwan province. The enterprise, which dates back to the fourth century, B.C., is universally acclaimed as a wonderful engineering feat, all the more meritorious because it was initiated in the days when engineering was an unknown science. It succeeded in transforming an almost barren plain, 3,500 square miles in extent, the only large expanse of level ground in Szechwan, into probably the most fertile area in China, supporting in prosperity a population estimated at six millions. This area is part basin and part alluvial delta, having an elevation of from 1,500 feet above sea-level on the south and east to 2,300 feet on the north-west and west. E. H. Wilson, in the first volume of "A Naturalist in Western China," says: "A striking feature of the plain is the enormous number of large houses and farmsteads dotted here, there, and everywhere, and shaded by groves of bamboo, nanmu and cypress. The frequency of these houses with their enveloping groves gives a well-wooded appearance to the entire region, and the general view is broken up in such a manner that from no point can many miles of the plain be seen at one time." Because of its wealth of agricultural products, it was known in Empire days as the "Prefecture of Heaven," and foreigners refer to it still as "the garden of Western China." Its rice crops never fail; it is a veritable land of Canaan.

The author of the system is stated to be Li Ping, who was Prefect of Shuh, the old division of part of Szechwan province, soon after this region was conquered by the State of Ts'in in B.C. 316. He is said to have conceived the idea and to have started the work on the canals, and his son is credited with the realization of the skeleton of the entire project. The Rev. T. Torrance, F. R. G. S., in the "Journal of the Royal Asiatic Society of North China," Volume LV, is inclined to challenge the story that Li Ping was the sole originator of the scheme. He says it is open to serious doubt whether "Li Ping did all that some nowadays give him credit for," and is inclined to uphold the claims of two other engineer-administrators who lived about Li Ping's time. One of them, Kai Ming, is recorded to have originated several irrigation undertakings which were so meritorious that the Emperor of Shuh vacated the throne in his favour. This point, however, must be left to the savants. The Chinese give the credit for the achievement to Li Ping and his son, whom they have deified, and they are supported by local history.

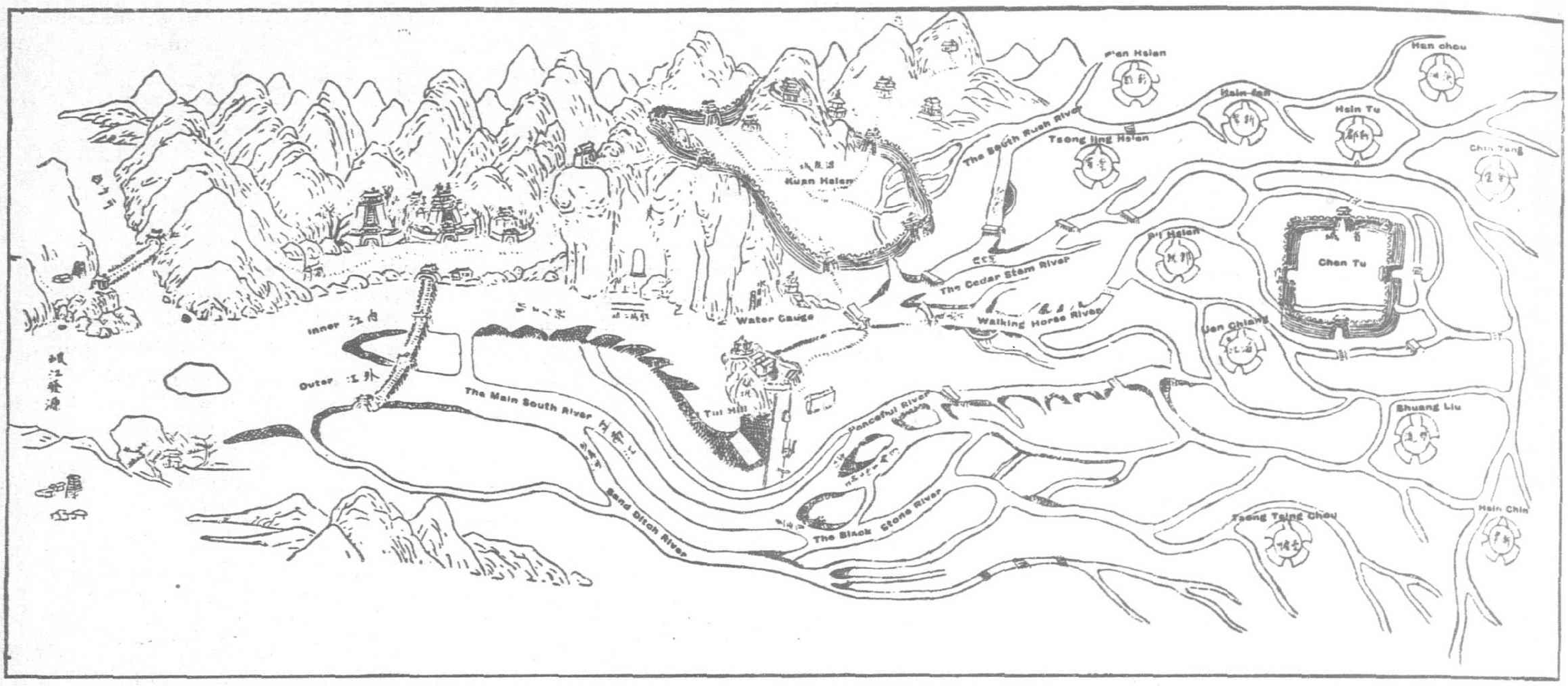
Li Ping was the first prefect of Shuh after it had been conquered, and instead of forcing the new rule down the throats of the conquered by force, he won them over by reforms and improvements. He found the Chengtu plain a barren land, over a great portion of which not even rice could be cultivated. The reason, of course, was lack of water. So Li Ping planned to better the lot of the Chengtu people, and after a thorough examination of the country determined to distribute the rushing waters of the Min river over the whole of the region. To do this it was necessary to cut through an intervening hill called Li Tiu Shan, just behind Kwanhsien, which is situated on the north-western edge of the plain, about 120 *li* from Chengtu.

That is how the system was started. Kwanhsien is the point of origin of the works, which are concerned solely with the fertilizing waters of the Min. The Min itself debouches from the mountains behind the Li Tiu hill. Its waters are partly diverted through the cut and then distributed along a fine network system of canals. The work took many years to execute, but, as initiated by Li Ping and his son, was successfully carried through by later generations, acting on Li Ping's, motto "Dig the bed deep, keep the banks low," meaning that a river whose high current runs below the level of the surrounding country could never become a menace to the people. When the enterprise was finally completed the great plain was criss-crossed in all directions with ditches and canals, which injected new life into the soil, and made it as productive as previously it had been barren. The whole of the plain was sub-divided into small fields, every field or series of fields having its own level, differing sometimes by one or two inches from that of its neighbors. This arrangement necessitated a complicated code of regulations, determining the proportions in which the water of any one canal is distributed into its branches, and the order of succession in which the farmers are allowed to make use of it.



A General View of the Irrigation System of the Chengtu Plain

More and more people were attracted to the region, and gradually custom, combined with common sense, rendered the preservation of the scheme the first duty of the inhabitants. Every year the bunding is repaired and all silt removed from the beds of the channels. An official styled Shui-li Fu—"Prefect of Waterways"—residing at Chengtu, has charge of the system. In late winter the water is dammed at Kwanhsien to admit of the removal of silt, and in the following spring the annual ceremony of turning on the waters is conducted with time-honored pomp and ritual. The Rev. Joshua Vale, writing in the "Journal of the Royal Asiatic Society of North China" Vol. XXXIII, describes this ceremony as follows: "The first day (of the ceremonies) is spent in inspection and worship at the temple (Kwanhsien), then on the morning of the second day the officials of the district with the Taotai proceed to the entrance of the dyke; the workmen then remove the barrier, and the water of the Min rushes into the channel of the Inner river,



CAPITAL DAM OF THE CHENGTU PLAIN IRRIGATION

This map is taken from one issued in the "Journal of the Royal Asiatic Society," No. XXXVI. The Rev. Joshua Vale, whose article this map illustrated, stated that it was of " entirely Chinese workmanship and . . . not drawn to an accurate scale. It is, however, the best procurable at present and will give some idea of the separation and distribution of the waters of the Min.

" *On the map the two great branches and their various channels are quite distinct. The inner branch, after passing Kwanhsien* city, divides into three main streams: the first, called the Walking Horse, flows directly east, irrigating the districts of Tsong-ling P'i-hsien, Uen-chiang, Chengtu and Hua-yang.

" The second, or central stream, called the Cedar Stem River, flows north-east, irrigating the western and northern parts of the districts above named, and unites with the Walking Horse River at different points on the way. The third stream, called the South River, flows north towards the districts of Hsin-fan, Hsin-tu, Han-chou, Kin-tang and thence to Chien-chou, Tz-chou, Lui-chiang, uniting with the Yangtze at Lu-chou.

" The ' Outer ' branch is the original channel of the Min. This branch is divided into four streams almost immediately opposite the Li-tui hill at Kwanhsien. The first (on the left) is named the River of Peace, and irrigates the districts of Kwanhsien, P'i-hsien, Uen-chiang *Hua-yang and Shuang-liu. The second, or central stream, is called the Main South River or Sheep-Horse River, and irrigates portions of* the above-named districts of Kwanhsien, P'i-hsien, Uen-chiang and Shuang-liu, and unites with the first branch at Hsin-chin. The third stream (on the right) is called the Black Stone River, and irrigates the districts of Ts'ong-ching-chou and Hsin-chin, uniting with the other branches at the last-named place. The fourth, called the Sand Ditch River, separates from the main streams some distance below the rope suspension bridge at Kwanhsien and flows south-west, irrigating parts of the districts of Kwanhsien, Ts'ong-ching-chou and Hsin-chien."

and the runners of the various officials lash the water with their whips to hurry it on its way; old women and children also stand on the banks and throw stones at the water to hurry it on its work of fertilization." This is apparently an original version of the practice of blessing the waters which is carried out in other countries. The irrigation system is perfect, each rice field receiving exactly at the right time a sufficient supply of running water.

Simple as is the conception of the system, it is very intricate in detail. The broad outline, taken from " A Naturalist in Western China," is as follows:

" An obstructing hill called Li Tiu Shan was first cut through for the purpose of leading the waters through and distributing them over the plain. The passage having been excavated, the waters of the Min River were divided, by means of an inverted V-shaped dyke, a little distance above the canal into two main streams, the ' South ' and ' North ' Rivers, as they are called. The waters of the ' North ' streams are carried through the Li Tiu Shan cut, and after passing through the city of Kwanhsien are divided into three principal streams. The most southerly of the three, called ' The Walking Horse,' flows directly east, and irrigates the districts of Pi Hsien and Chengtu. The central stream, called the ' Cedar Stem River,' flows north-east, and is utilised to irrigate the western and northern parts of the above-named districts. Branches of these two streams flow past the south and north walls of Chengtu, uniting near the east gate of the city. The third, or northern branch, known as the ' South Rush River,' flows north towards the city of Peng Hsien, and then south-eastwards past Han Chou. All the sub-divisions of this branch and its anastomosing canals and ditches unite near Chao-chia-tu to form the head waters of the To River, which flows due south past the famous salt-wells of Tzu-liu-ching, and finally enters the Yangtsze at Lu Chou. This ' South Rush River ' is fed by numerous torrents which descend from the ranges bounding the north-west edge of the plain. These streams—broad, stony, irresponsible things with no defined banks—exist only during rains or the melting of the snow in spring. In crossing the northern parts of the plain the traveller can form some estimate of what the whole was like before the irrigation canals were dug and dykes erected.

" But to return to the system at Kwanhsien. The ' South ' River, whch occupies the original bed of the Min River, is divided into four principal streams almost immediately opposite the Li Tiu Hill. The most easterly branch, named the ' Peaceful River,' irrigates the districts of Kwanhsien, Pi Hsien, and Shuangliu Hsien. The next branch, called the ' Sheep Horse River,' irrigates other parts of the above-named districts, uniting with the ' Peaceful River' at Hsinhsin Hsien. The third stream, called ' Black Stone River,' irrigates the department of Chungching Chou, and unites with the other streams at Hsinhsin Hsien. The fourth stream, called ' Sand Ditch,' flows south-west through Tayi Hsien and Kiung Chou, joining the other streams at Hsinhsin Hsien. All the streams which intersect the Chengtu Plain, save those forming the upper waters of the To River, unite at Chiangkou, a village at the extreme south-eastern edge of the plain, some 45 English miles south of Chengtu city.

" This system of anastomosing canals, ditches, artificial and natural streams, forms a complex yet perfect network. The current in all is steady and swift, the bunding secure, and floods unknown. Not only are all these streams and canals available for irrigation, but they are also utilized to generate power required in various industries. Flour-mills abound, driven by vertical or horizontally fixed water-wheels. Similar mills are used for crushing Chinese rape-seed, preparatory to pressing for the extraction of the oil."

Little is known of Li Ping's original scheme beyond a skeleton account, but local history furnishes many interesting details about the progress of the undertaking to its recent state of perfection: The Rev. Joshua Vale, writing in the " Journal of the Royal Asiatic Society of North China," Vol. XXXIII., gives the following summary:

" We gather from various quotations of other works in the History of Kwanhsien some accounts of these additions and improvements. It appears that, apart from the necessary repairs and yearly cleaning of the channels to ensure a plentiful supply of water, no additions or improvements were made till the first year of the Yuan dynasty (A.D. 1280-1368), some fourteen hundred years after its completion by Li in the Ch'in dynasty (255-206 B.C.). In that year we are told that the Judicial Commissioner Chih Tang-p'u, who regarded the Tu Kiang, *i.e.*, 'Inner' river, as the chief stream of the 'Min' river, had an iron tortoise moulded out of 66,000 catties of iron; this was placed in the bed of the river and fastened in position by an iron pillar to resist the force of the water and keep back the *débris*. Having taken this preliminary precaution, he commenced his intended improvements as follows: he lined all the dykes with quarry stone, stopping up all the holes with molten iron; he also mixed T'ung oil with lime and calked up the cracks and leakages, thus preventing the water from soaking through the dykes and banks. At those places most likely to fall in he filled in closely with stones out of the river bed. He planted willow trees on the banks to strengthen them, and shrub briars as close together as the teeth of a comb, thus securing solidity and durability. The old channels he had cleaned out, causing the waters to flow freely, and opened up new channels, reducing the force of the water. At the junction of two streams he made flood-gates that could be opened or closed at pleasure, in order to disperse or store up the water. In fact, the writer says, 'he did everything that wisdom could devise and strength carry out.'

"The next addition was made in the year of the same dynasty by Li Ping-i, who was Assistant Judge of Shensi. Having paid an official visit to Kwan Cheo (Kwanhsien), he ascertained that in times of great floods the waters of the Min frequently damaged the dykes, and further that the yearly tax upon the people for repairs was regarded by them as a burden; he therefore ordered that the dykes should be built more securely, but when the 'old men' of the district heard of his plan they objected because they were afraid that if the waters were dammed up, when a flood arose it might do serious damage to the capital, Chengtu. Li, to convince them of their folly, ordered them to throw a stone into the stream; when they had done so he asked them 'Did the water flow over or under the stone?' 'Over,' they answered; whereupon he appointed officers to oversee the work, which was completed in three months; thus in flood times the waters flow over the dam, and in times of drought the waters are kept in reserve to irrigate the fields. 'The benefits of Li Ping-i's additions,' says the writer, 'are felt even down to the present day.'

"The next addition was made in the reign of Kia Ch'ing of the Ming dynasty. A certain official, Shi Ch'ien-ts'iang, made a pair of iron oxen out of 70,000 catties of iron; each ox measured 10 feet; he made the oxen to come together in the shape of the character 'man,' the head and tail meeting. The sharp angles of the oxen were put so as to meet the force of the water. Above the edge of the dyke, on the heads of the oxen, he had these words engraved:—

'The ox's head reveals the top,
His feet disclose the bottom.'
'Covered by the floods the horns,
Betoken plenty in the barns.'

"Referring to the making of these oxen, a writer says: 'When water is brought in conflict with any substance the heaviest prevails; it is possible to bring together tens of thousands of stones, but you cannot unite them in one body, but tens of thousands (catties) of iron may be melted and thus united in one; being united, it makes one solid weight, of which there is nothing heavier. When water is brought in conflict with such a weight it rebounds and divides itself into many streams; divided thus, its strength is weakened; in this weak condition even bamboo, wood, or sand may resist it; thus, though there is nothing more swift than the waters of a dyke, yet there is no better way to cope with it than by using iron.'

"One Kao Kong Shao, in speaking of this work, said: 'Shi Ch'ian K'iang first of all placed bamboo baskets and fences 30 feet above the entrance to the dyke, in the bed of the river, to cut off the stream; he then dug out the channel and drove in some 300 cedar piles closely together, and filled in the center with earth, level with the top of the piles; he then spread beams crosswise over the piles and covered the whole with stone slabs ten feet long and two feet thick. Having done all this he bound the whole together with iron clamps. At the bottom of the river, near the oxen's feet, he made a plate of iron which was shaped like an ox's head above the level of the water.'

"Further improvements were added in the ninth year of Hong Chi, of the Ming, by the District Magistrate of Kwanhsien, whose name was Fu Kuang. We are told that he lined the old foundations of the dyke with quarry stone and plugged them together with three iron spikes, each 12 feet long. This he did to break the force of the water. In the centre of the embankment he also used putty and lime for a distance of 25 feet to keep the whole together. We are told that in these works he used 33,200 catties of iron, 500 catties of putty, 200 catties of hemp, and 2,500 pieces of timber. The total amount of labour of all kinds was 253,200 days!

"Again, in the reign of Wan Lih, of the Ming Dynasty, there being a great flood on the Min river, the Governor, Kueh, gave orders that iron pillars should be added to the dyke and that the channel should be cleaned out; he also ordered that along the banks at Pao Ping Kuo, San Pei Tung, Wu Tou Kou and Fu Tou, thirty iron pillars, each 10 feet long, should be placed. These pillars took 30,000 catties of iron. This official also planted trees to support the pillars, and built embankments to protect the sides of the dyke. It is stated that the Governor himself drew the plans and had the work completed in six months, at a cost of 300 catties of gold.

"Having briefly traced under our last head the additions and improvements during the various dynasties down to the end of the Ming, we now proceed to describe the present condition of the dykes, their yearly cost, etc.

"The present system of using bamboo baskets filled with stones, instead of the iron oxen, tortoise, etc., dates from the Ih Hai year of the Ming dynasty.

"We have no account of the actual cost of the original dyke, and only incomplete statements of the cost incurred by the additions and improvements. One of the writers above quoted says that formerly there was an inequality in the selection of workmen to repair the dyke; therefore Lu-i, 'Superintendent of Water Communications,' ordered that one man for every farmer paying taxes on 300 bushels of rice should be selected. These men were selected for eight courses covering a period of eight years. He also ordered that the farmers in the Ch'engtu district should supply the required bamboo for the yearly repairs, and also appoint an official to superintend the plaiting of the baskets and filling them with the stones. Lu-i said hundreds of thousands of taels were spent on iron pillars, iron tortoises, etc., which were swept away when a great flood arose, bamboo baskets being more economical and convenient, as everyone would admit. This system of taxation instituted by Lu-i does not seem to have worked satisfactorily, as we find that in the 9th year of the same dynasty the Governor, Hsia Uen, seeing the inconvenience of the system, ordered that the two districts of Kwan and P'i should raise the required number of workmen between them, and that the other districts using the waters of the dykes should supply the required materials. In the 16th year of the present dynasty the Governor, Kao Min-chan, with the Taot'ai and other civil and military officials, made a subscription of 20,000 taels for the repair of the dykes.

"In the 18th year of the same reign the Governor, T'ong Feng-ts'ai, memorialized the throne on the subject. He said that after the rebellion of Chang Hsien-chong there was a scarcity of people and the dykes fell into decay, and that the subscription of the various officials in the 16th year of the same reign only served to have the dykes cleared for the time being; he therefore petitioned that the old custom of selecting workmen according to the tax paid should be reverted to; then the people would have no fear of drought, and the Government no anxiety in regard to revenue.

"In the year of K'ang Hsi there was a great flood which carried away the dykes. This flood caused much suffering to he people, the towns, villages and hamlets alongside of the river being inundated. When the sufferers reported their cases the Governor, Leng T'ai, subscribed for their relief and also devised a scheme to avert a similar calamity in the future. To accomplish this he reduced his own stipend, and all the officials followed his example, from the Treasurer downwards.

"It is said that at that time the yearly repairs were done by selecting workmen from amongst the farmers according to the number of fields under cultivation, but in the 48th year of K'ang Hsi this was changed to a tax of one tael for each workman; thus Kwan-hsien, which formerly supplied 69 workmen, was taxed 69 taels, and the other districts rendered official service when required.

"In the 8th year of Iong Cheng, when the measurement of the land was completed, the Governor memorialized the throne on the subject. After enumerating the various steps in the building of the dykes from Li Ping downwards, he says: 'Formerly the yearly expenditure was supplied by selecting workmen according to the number of fields using the water; thus Kwan-hsien had 69; Uen Chiang, 11; P'i Hsien and T'songling together had 480; Hsin Fan, Kin T'ang, Ch'engtu and Hua Nang each had 90; and Hsintu 36, making a total of 883 men for the nine districts, which, reckoned at a tael each, equals Tls. 883. From the time of Iong Cheng the yearly expenditure has varied; some years five or six hundred taels sufficed; other years the amount was as much as seven or eight hundred. In the fifth year of that reign an embankment at Jen Tze Dike having fallen in and choked up the channel, the expenditure rose to the sum of twelve hundred taels; 'therefore,' says the memorialist, 'it is calculated that there should be an amount of twelve hundred and thirty taels yearly to meet the expenses likely to be incurred, and thus avoid anxiety.'

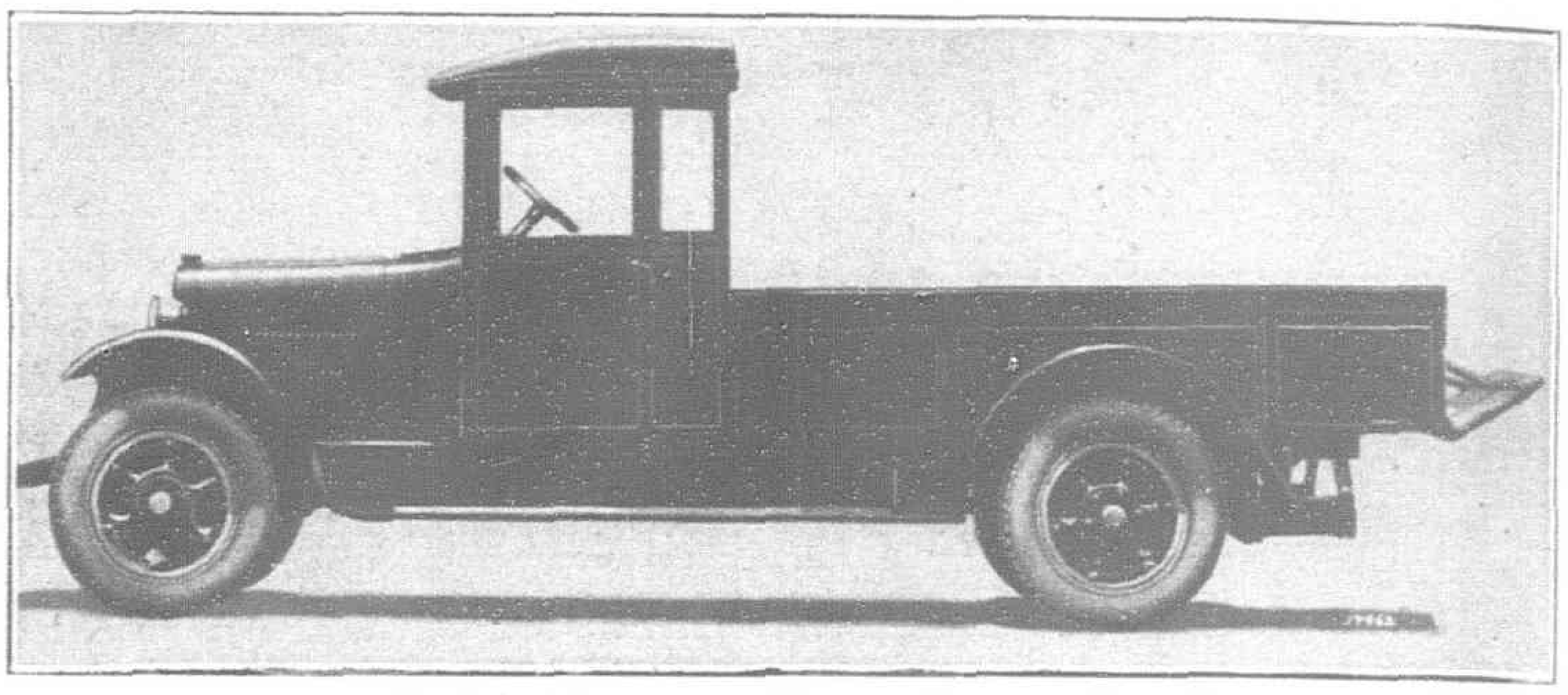
"He continues by saying that formerly the workmen were selected according to the number of fields cultivated, but this arose because there was no certain record of the acreage under cultivation; but now, that having been ascertained, if the old system still be followed with no regard to the size of the field, a great inequality will be the result; therefore, it is requested that the calculation and allotment be based on the number of acres cultivated; thus partiality will be avoided. 'Now,' he continues, 'it is ascertained that Kwanhsien and P'i-hsien, being near to the source of supply, get full advantage of the water, and that Uen Chiang, Hsin Fan, Hsin Tu, Kin T'ang, Chen Tu, and Hua Iang, being at a distance of over one hundred *li*, there therefore should be a distinction made of the assessment; thus Kwan, P'i, Ts'ong are assessed at .015 per acre. Again, there are places in the Hua Iang districts, having a small supply of water, and they are assessed at .010 per acre. Now, according to the "Records of Measurement," Kwanhsien has 116,198 acres and pays a yearly tax of Tls. 232.39; P'i Hsien and Ts'ongling together have 191,625 acres and pay a yearly tax of Tls. 383.25; Uen Chiang, 1,294 acres and a tax of Tls. 1.95; Hsin Fan, 46,753 and tax Tls. 70.13; Hsin-tu, 76,971, tax Tls. 115.46; Kin-t'ang, 55,357 acres, tax Tls. 83.35; Ch'eng-tu, 192,726 acres, tax Tls. 298.89; Hua-yang, 54,639 acres, tax Tls. 81.96; the acreage in the Hua-lang district, with insufficient supply, amounts to 24,975 ares, and pays tax of Tls. 29.98; thus the total acreage is 760,539, and the total tax Tls. 1,282.23. This amount is collected yearly from the various districts and forwarded to the "Prefect in Charge of Water Communications" at Kwan-hsien. This official prepares an estimate of probable cost for the yearly repairs, giving each item of intended expenditure; this estimate is sent to the Intendant of the Long Meng Circuit, who forwards the same to the Provincial Treasurer. Another list is also sent, after the repairs have been completed, for examination. Should there be an overplus, it is kept at Kwanhsien to meet any expenses incurred during the summer or autumn by high water or floods.

"'According to the regulations, the yearly allowance of bamboo poles used for repairs is 393,540; forty bamboos are plaited into one basket thirty feet long, one foot eight inches in diameter: the parallel slips of the baskets are the width of four fingers and the cross slips the width of three fingers. The official price of each basket is fixed at Tl. 16 cents each.

"'The baskets used to dam the river for the yearly cleaning are priced in proportion to the other baskets, each costing 19 cents. If the baskets used exceed the annual allowance, then the price for the additional baskets is raised to 34 cents. The yearly allowance of bamboo baskets is 13,743.'"

The same writer, in Volume XXXVI of the "Journal of the R.A.S.," in describing the dams, gives the following account of one feature of the subsidiary workings of the system:

"Before closing the description of the Capital River Dam it may be of interest to point out a few special features in connection with the main branch of the 'Inner' river after passing the capital to its junction with the 'Outer' branch at Kiang-kou. This branch, which is the chief waterway to the capital from the south, is known locally as the Fu river, *i.e.*, the prefectural river (this is the name given to the Min locally from this point on to its junction with the Yangtsze at Sui-fu). During the flood season, usually from May till September, it forms quite a considerable stream, and large passenger-boats ply between the capital and the south; but when the waters are cut off at Kwanhsien to clean the inner channel, this river becomes a very shallow stream which can be forded at many points. During this season the larger boats tranship their cargo at Kiang-kou and either go on the rest of the journey empty or stay at Kiang-kou. For the purpose of irrigating the plain on either side for a distance of about 40 miles, there are, at stated intervals, some 44 dams or weirs, with some 200 Persian wheels in groups of three, four or six. These wheels raise the water from the river and spread it over the plain, irrigating a wide area some distance from the riverside. In addition to the weirs above mentioned, or in conjunction with them, there are a number of places with channels for mills. But the chief point of interest is the dams, of which there are three. The first is the Stone Ox Dam, one mile below the capital. This dam supplies the plain with water for a distance of about eight miles, where there is a second dam, called the Elder Sister Dam. During the early summer, when the water is needed for the fields, these two dams are closed, *i.e.*, the river is cut off completely and all boat traffic is stopped. During this season, which usually falls between the end of April and the end of May, hundreds of boats congregate above and below the dam, and when the dam is opened to allow official boats to pass up or down, a perfect panic takes place amongst the boatmen. The third dam is some 20 miles below the capital and is much larger and more substantial than the two others, being built of stone. This dam irrigates 1,733 acres of land on the left side of the river, re-uniting with the main stream again at Kiang-kou."



Graham Brothers 1½-ton Canopy Truck

Graham Brothers in First Place

Sturdy Truck Makes Remarkable Advance

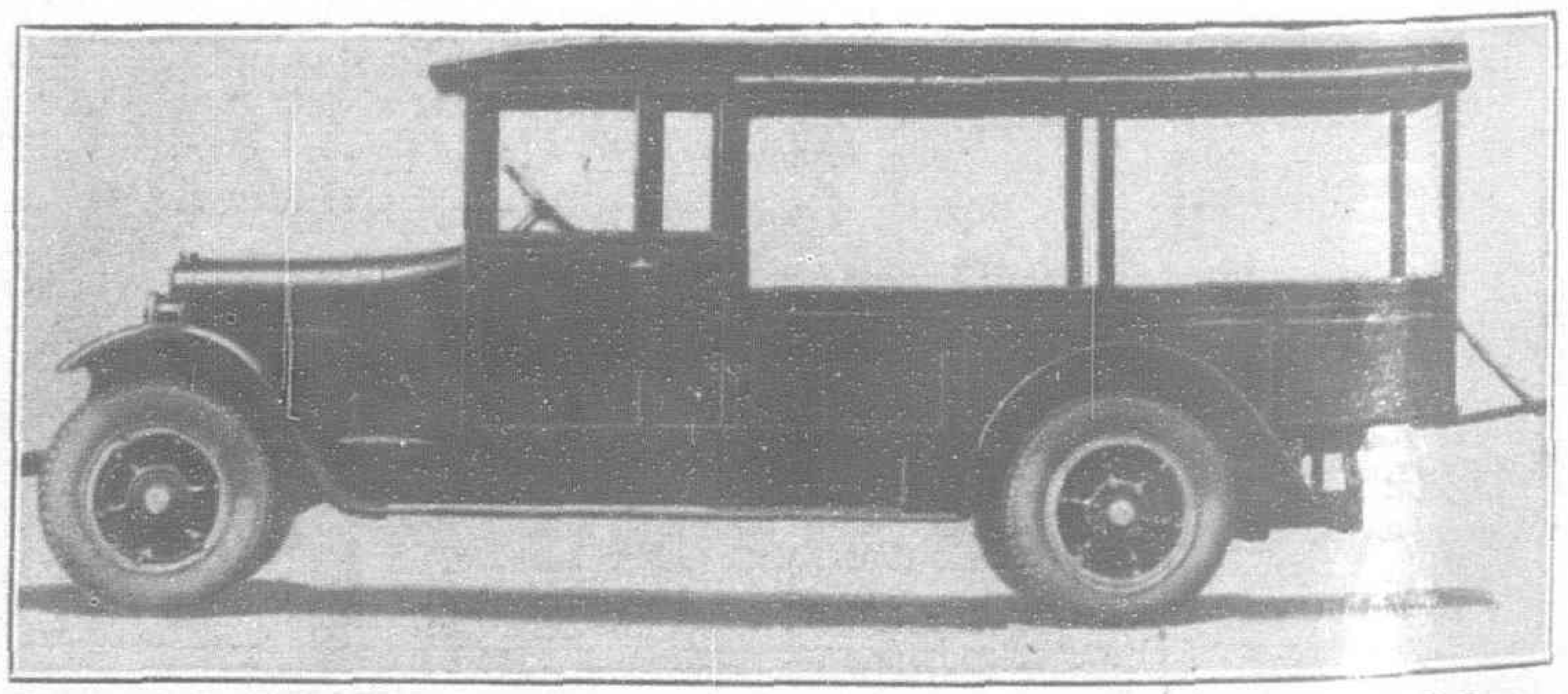
OFFICIAL figures from Detroit for the first quarter of 1925 show that Graham Brothers rank first in the world in the production and sale of 1½-ton trucks.

In the 1-ton and 1½-ton truck fields combined they were surpassed in volume only by Ford. The information may be surprising to the general public, but not to those who are familiar with the performance of Graham Brothers trucks and with their rapid ascendancy in the industry during the last three years.

Their advance has been without ostentation. There has been no blare of trumpets, no exaggerated claims. It has been a steady, wholesome growth, based entirely upon the truck's performance.

Less than three years ago Graham Brothers were in twentieth position. Now they are manufacturing trucks at the rate of over 100 a day, marketing their entire output through Dodge Brothers dealers. This sales and service advantage of a strong dealer organization, combined with the exceptional merit of the truck itself, is regarded as one of the chief reasons for the rapid advance to leadership. Dodge Brothers dealers everywhere are highly regarded, and their service facilities are uniformly above the average. Service is an exceedingly important factor in the operation of a truck, and business men are not slow to appreciate the advantage of having genuine parts instantly available when needed. Graham Brothers attribute their rapid advance to the following four reasons:

1. Distinct price advantage.
2. Pronounced quality advantage.
3. Dodge Brothers engine.
4. Substantial character of Dodge Brothers dealer organization.



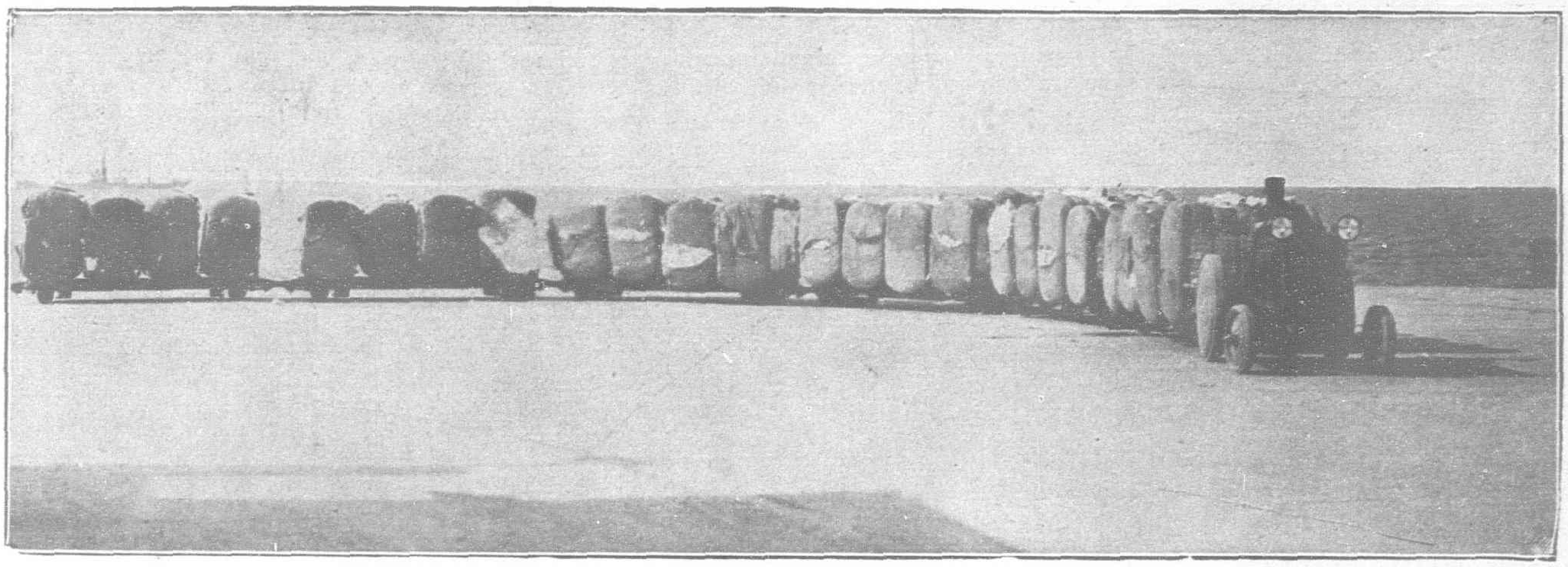
Standard 1½-ton Graham Brothers Express Trucks with Closed Cabs

Handling Bales of Cotton

Heavy Duty Trailers with Roller Bearings

A NEW PROBLEM in industrial hauling came to light when the Norfolk Warehouse Corporation, of Norfolk, Va., built a cotton compress plant in connection with large storage facilities leased at the big army supply base near Norfolk.

This army base plant was built during the war for concentrating and shipping army supplies to France. After the Armistice the War Department decided to release all vacant storage space for industrial purposes, the cotton trade of the port of Norfolk taking over room for the storage of approximately 200,000 bales of cotton.



Loading heavy bales of cotton requires a low trailer with small wheels. These trailers are run in trains of six

The plant consists of eight units about 150-ft. wide by 1,700-ft. long, divided into twelve compartments each, all served by railroad facilities on one side and concrete roads on the other. In such a lay-out the distances are great indeed. In addition to the warehouse units there are two enormous deep-water piers capable of handling a number of ocean-going vessels at one time, both discharging and taking on cargo. Water-borne cotton cargoes are assembled at shipside on these great piers, and the cotton is hauled to them from varying distances, the longest haul being 4,400-ft., with the average somewhere around 2,500-ft.

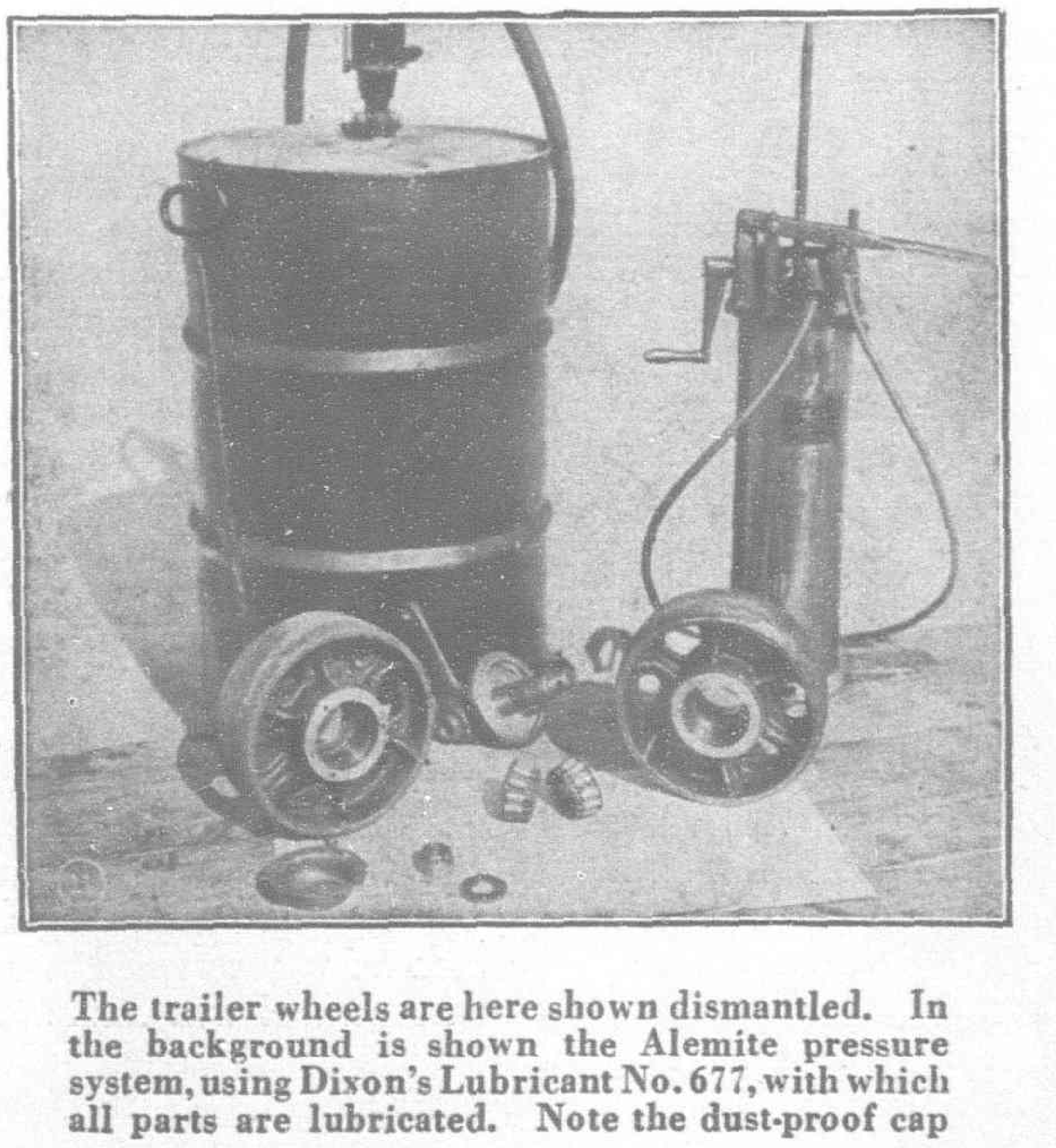
Since before the Civil War all cotton in the port of Norfolk had been handled by the old familiar hand-truck, with negro labourers as the motive-power. It was a jolly crew in the old days of short trucking distances and cheap labour, but the new situation demanded radically different treatment.

A survey of available mechanical equipment did not offer a solution; hence something new became necessary. It was found that for quick, cheap and accurate handling an industrial trailer 10-in. high, 36-in. wide and 10-ft. long would be the ideal, and such a design was drawn up. This design offered some mechanical troubles, due principally to the small wheels. A compromise was made by using 10-in. wheels, and making the height of the trailer 12-in. from roadway to top of loading platform.

With such small wheels the "castor" type of trailer was automatically eliminated. It also being necessary to have trains which could be hauled from either end, only the "four-wheel-steer" type was suitable and practicable for existing conditions, and this type was adopted. After two years of constant supervision and study, this equipment has now been brought up to a reasonably efficient performance.

Originally, 125 trailers were used, equipped with roller bearings and hauled by storage battery tractors. Later on, gas tractors, with a special design water-cooled muffler and fully protected engine were tried out, and have largely replaced the storage battery tractors, on account of greater speed, larger hauling capacity and more flexible operation. The difference in speed of train movement between three miles per hour by electric tractor and ten miles per hour by gas tractor is a valuable asset for this operation. Both types of tractors are in use now; the electrics for short haul and the gas for continuous long haul.

Speed of train operation and amount of equipment needed is determined by the maximum output of the compresses, which varies from 90 bales per hour to 130 bales per hour per press. Wherever located on the plant, and wherever it must be delivered after compression, the incoming flow and distribution of compressed cotton (or the outgoing flow) must never retard the operation of the compresses. A loss of only a few minutes at a press means a loss of many dollars.



The trailer wheels are here shown dismantled. In the background is shown the Alemite pressure system, using Dixon's Lubricant No. 677, with which all parts are lubricated. Note the dust-proof cap

This season the Norfolk Warehouse Corporation's equipment consists of 175 Lakewood trailers, six gas tractors, and four Lakewood electric tractors. The trailers are equipped with cast-steel wheels, using adjustable heavy-duty Timken tapered roller bearings. Dust-proof design keeps the bearings free from the cement dust raised by the train movement over concrete. All parts are lubricated by Alemite pressure system using Dixon's Lubricant No. 677.* Operating results with the present equipment are satisfactory.

Trains of six trailers each are run. Each train is a unit, found to be the

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*Messrs. Walworth International Co., of 29, Szechuen Road, Shanghai, are representatives in China and the Phillippine Islands for Messrs. Dixon's manufactures.

Trailers ten feet long, three feet wide and twelve inches high, and equipped with roller bearings, are used on this concrete pavement. Each trailer carries four bales of cotton, or an average load of 2,000 lbs.

proper length for this operation. Each trailer carries four bales of cotton, or an average load per trailer of 2,000 pounds, going to the compress. After compression, five bales are loaded per trailer, due to the decreased size of the bales, making an average load of 2,500 pounds per trailer.

Service station and charging plant is maintained, in charge of competent mechanics, to keep all equipment in proper operating condition. The equipment and operation, says the *Railway Purchases and Stores*, is probably as unique an installation as will be found anywhere in connection with cotton handling.

Railway Engines for Ceylon

Announcement has just been made that the Railway Department of Ceylon has requested the Finance Committee to include in the 1925-1926 Budget Rs. 1,080,000 for the importation of six engines to replace scrapped engines, and ten others to meet the growing traffic requirements, as well as Rs. 984,718 on account of importations of wagon underframes. It is suggested that there would be a substantial saving over a number of small contracts if all this material were ordered at one time, and the Crown Agents in London are to be consulted as to the most advantageous method of importing it. In view of the rapidly expanding revenue of the island it is probable that the expenditure on railway improvements in general will be larger in the current year than it was previously.

Owing to the recent extension of the railway from Bandarawela to Badulla, a distance of 20 miles, the doubling of the line between Colombo and Palawela, and developments at other points, covering a total of 293 miles, certain of the modern type of engines owned by the Ceylon Government Railway had to be run last year from 50 to 100 per cent. more miles than in 1911-1912. The frequent engine troubles experienced of late are attributed to this hard work, which has rendered it more or less impossible to keep the engines in prime running condition.

New Tin Dredger for Malay

The recent launching at Goss Moors, near Roche, Cornwall, of a 200-ton tin dredger marks a new departure in alluvial tin mining in Great Britain. Although a familiar figure in the Malay States, this is the first time a dredger has been used in England for this purpose. The cost of the dredger was in excess of £12,000.

It has been constructed to the order of the British Alluvial Tin Syndicates Ltd., who have leased over 1,000 acres of alluvial tin deposits from Lord Falmouth. The dredging apparatus on the ship is worked by three 80-h.p. engines, the entire operation of converting the alluvial into tin concentrates being carried out on board as the dredger proceeds. It has forty buckets which are capable of dealing with three tons of alluvials per minute, and has on board 16,000 square feet of dressing tables. It is stated that the alluvial deposits being worked assay 70 per cent. of tin concentrates, which, with the price of tin metal at not less than £200 per ton, are worth £140 per ton. The area to be worked is estimated to yield 7,000 tons of tin concentrates. The prospect of a long period of employment to a considerable number of men is a source of great satisfaction in Cornwall, where employment in the tin mining industry has long been very restricted.

Germany Building British Ships for Far Eastern Service

Undoubtedly the most important shipbuilding contract placed for many months past is that which the Furness, Withy Line has recently given to the Deutsche Werft, of Hamburg, for the construction of five fast motor-ships of 10,000 tons deadweight each. This is the biggest order that has been placed by British shipowners since Andrew Weir & Co. ordered their twenty motor vessels some months ago, and, with the guarantee that was granted to Sir William Petersen under the Trade Facilities Act, now withdrawn, it is likely to be the largest order for some time.

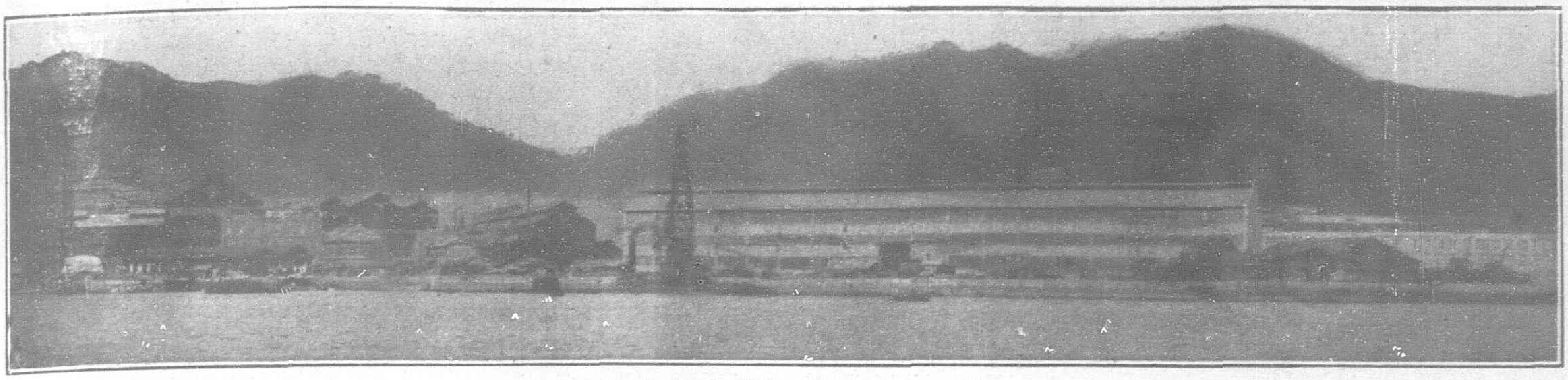
Messrs. Furness, Withy have been planning for some months the details of these new vessels, which are intended for their new Far Eastern service. This service will be run on most competitive lines. The German tender for the vessels was well over £66,000 per ship less than the lowest British, and there was also an appreciable difference in the time guaranteed for delivery by the German yard. The line has under consideration the addition of seven more motor vessels. When it is decided to place orders for these it is hoped that British builders and engine firms will be in a better position to compete with German and other Continental firms.

Another New P. & O. Launching

There was launched on January 27, from the yard of Messrs. Alexander Stephen and Sons, Ltd., Linthouse, Govan, the large steamer *Chitral* for the Peninsular and Oriental Company.

The *Chitral* is a twin-screw steamer of 15,000 tons gross, her length being 546-ft., breadth 70-ft., and depth 46-ft. The vessel is one of the P. & O.'s new class now building for the Far Eastern mail service, and will make her first trip to Australia. She is fitted with very up-to-date and extensive accommodation for 200 first-class and 100 second-class passengers. She is also specially designed for cargo trade and is fitted with large refrigerating chambers, as well as ordinary holds and 'tween decks for the carriage of goods and mails, which are handled by a large number of electric winches.

The vessel is designed for a speed of 16 knots on service, and the propelling machinery consists of twin screw quadruple expansion balanced engines developing 13,000 i.h.p. and making steam from seven large boilers burning oil fuel under forced draught. The *Chitral* was launched by the Hon. Elsie Mackay, daughter of Viscount Inchcape, chairman of the Peninsular and Oriental Steam Navigation Company.

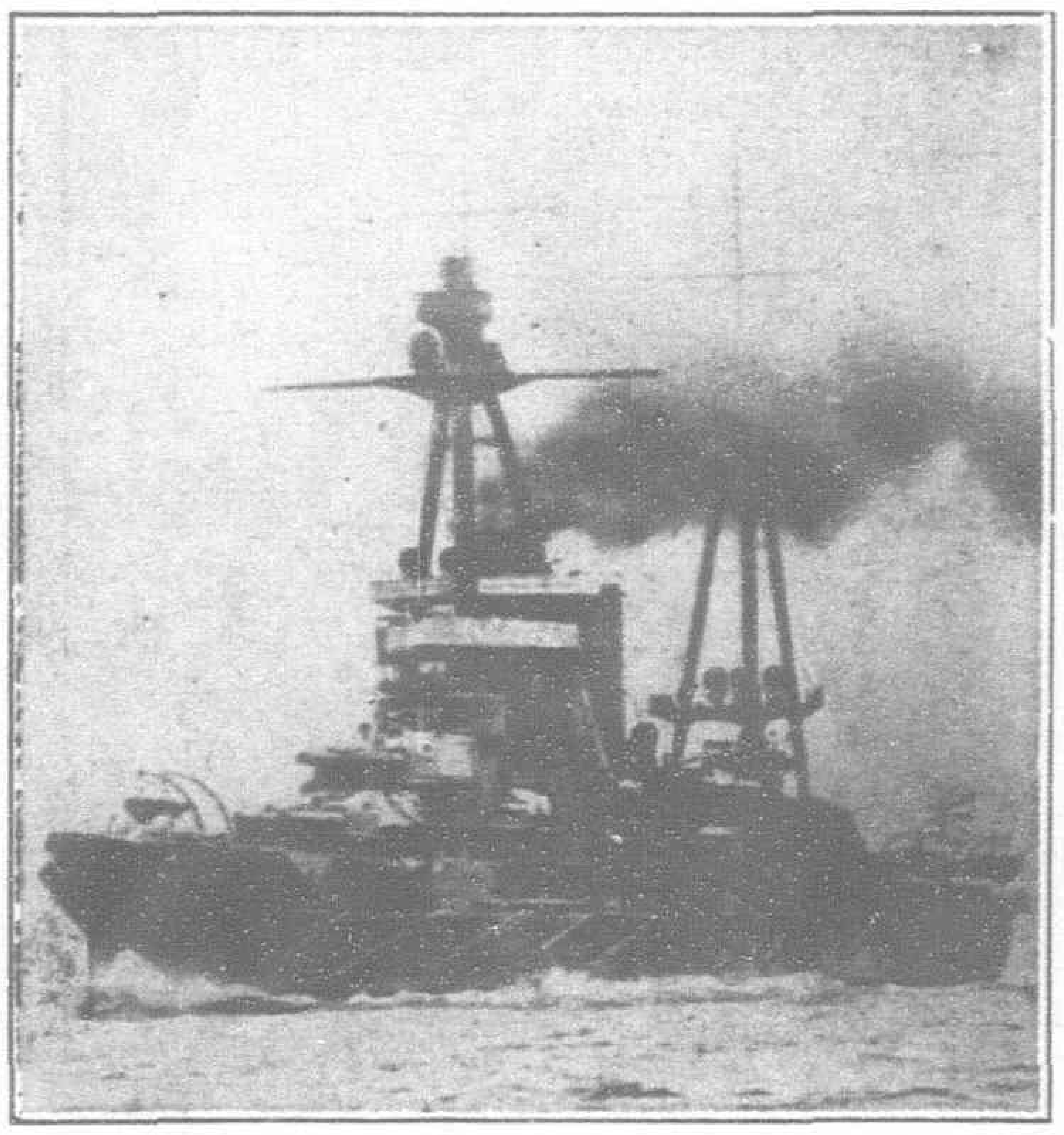


Mitsubishi Shipbuilding Yard at Nagasaki

Japan's Contribution to Naval Architecture

By Dr. F. P. Purvis

JAPAN'S indebtedness to outside help is no doubt a prominent feature in the material and other progress she has made. This country's share in that help is notable in many directions. Other countries besides our own have had their share in rendering help; it would be interesting, but outside the purpose of the present paper, to give an account of Japan's technical advisers from time to time. There is one who must be mentioned, viz., M. Emile Bertin, so recently deceased, an honorary member of our own Institution.



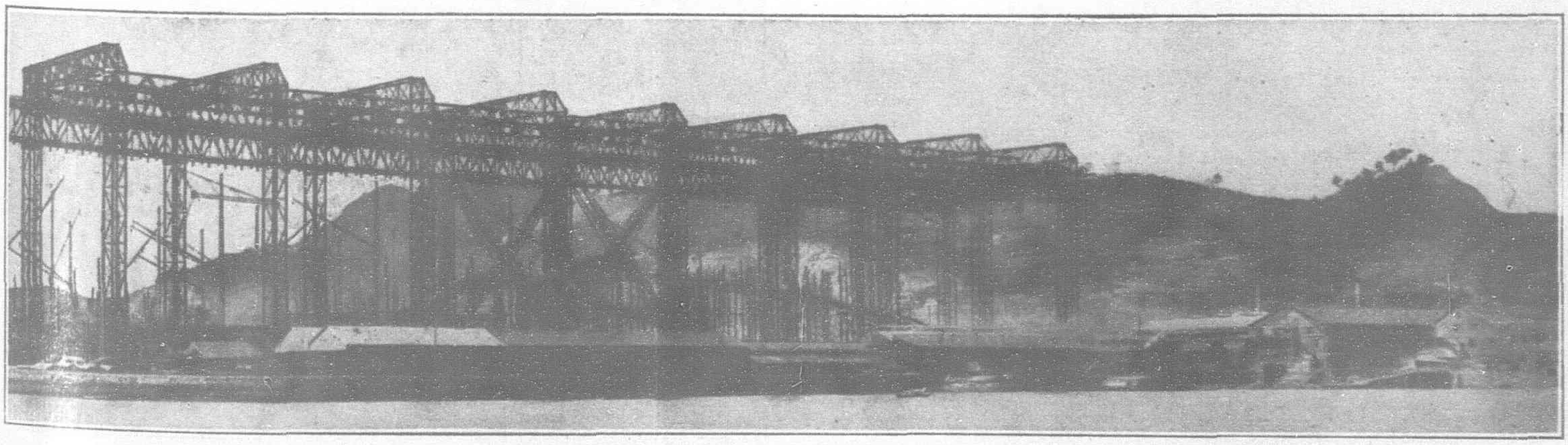
A Recent Type of Japanese Battleship

In company with the name of M. Bertin it seems only natural to record the names of the British constructors—Sir Edward Reed, Dr. Elgar, Sir William White, Sir Philip Watts, Sir Alfred Yarrow. At various times and in various ways they did not a little to assist Japan in the development of her Navy; from the designs of the last three were built, respectively, at Elswick, the protected cruisers *Naniwa* and *Takachiho,* and later the Armstrong cruisers, and, at Poplar, the Yarrow torpedo-boats and destroyers; of these ships the two first-named distinguished themselves particularly at the battle of the Yalu River, and again, in 1905, at the battle of the Japan Sea in the Russo-Japanese War; the armoured cruisers helped prominently in the battle of the Japan Sea; and the Yarrow vessels in the attacks on Port Arthur in the same Russo-Japanese War. On the one hand, Japan has received much assistance in and from other countries; on the other, she has known how to appreciate and use this assistance in a very practical way.

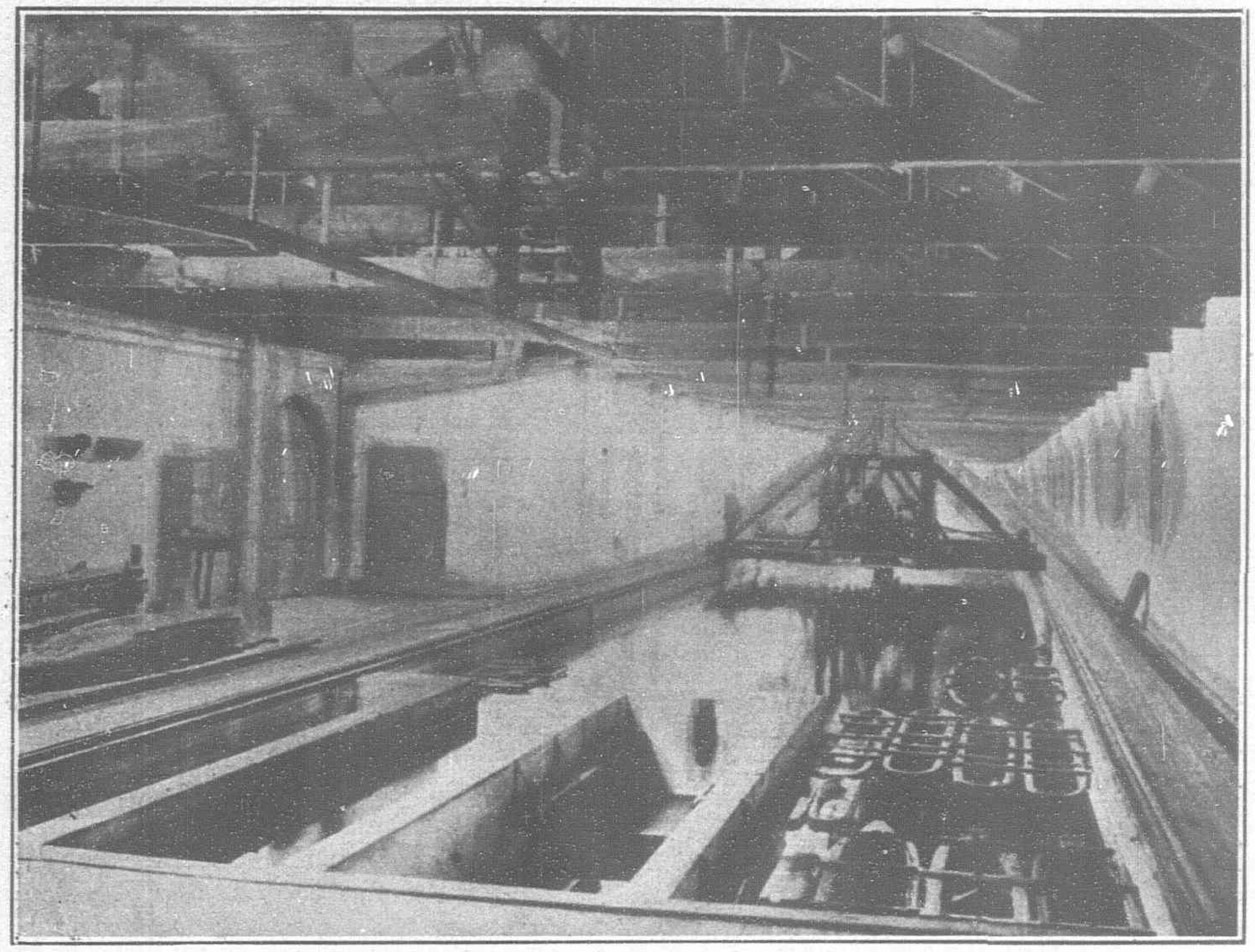
In 1909 the Japanese Navy Department commenced the construction of its experimental tank at Tsukiji, Tokyo; experiments were started in 1911 under the direction of Constructor Vice-Admiral (then Rear-Admiral) Kondo, now retired. Its dimensions were 500-ft. by 20-ft. by 11-ft. depth of water; an addition of 80-ft. to the length was contemplated but never carried out. The structure was wrecked by the terrible earthquake of September 1, 1923, and completely destroyed by the fire that followed. The loss of this tank will be temporary only; the Navy Department has instituted studies to help towards the building and equipment of a new tank adapted to its needs; in due time these studies will certainly lead to a tank establishment capable of carrying out all investigations that can be anticipated for it. On more than one occasion the author has indicated to friends connected with the Tsukiji tank that it is a great pity the profession was not told from time to time a little about their work and progress; the answer has always been that a Government Department, no less than a private individual, is the best judge in its own house of what it allows to go outside.

Another experimental tank in Japan is that constructed in 1908 by the Mitsubishi, Shipbuilding Company at their Nagasaki shipyard—its dimensions are 430-ft. by 20-ft. by 12-ft. depth of water. From the first Dr. Motora has been in charge. Of the work done at this tank not much information has been published; but in 1922 Dr. Motora described (in Japanese) to the Society of Naval Architects (Zosen Kyokai) an invention of his own which he had thoroughly tried out in it.

In 1904, during the Russo-Japanese War, the Japanese Volunteer Fleet Association became active as a body analogous to the Russian Volunteer Fleet, so influential and important in the days of its power. Three ships were built in Japan under the auspices of this Association; they may have fulfilled the expectations formed of them, but did not establish any particular record. In 1914 the functions of the Japanese body were extended to embrace also ship



Movable Crane at Mitsubishi Yard



The Experimental Tank at the Mitsubishi Shipbuilding Yard

classification duties, and the hope was entertained that this side of its functions might develop into an important national responsibility; the Association then or earlier became known as the Teikoku Kaiji Kyokai, words which have had a varying English translation and are now rendered Imperial Japanese Marine Corporation.

Japan's influence, direct and indirect, on the development of modern types of warships would form an interesting study; but this must be left to those who have taken an active part in the naval progress of the last two decades, or who have traced the connection between war experience and subsequent construction. One detail may be referred to here, and that is the design and construction of the *Tsukuba* and *Ikoma*, laid down at Kure Imperial Dockyard in 1904, and launched in 1905 and 1906: armoured cruisers with a displacement of 13,750 tons and speed of 21 knots, provided for the first time in the development of the type with an armament of four 12-in. guns. These ships are regarded in Japan as initiating in some respects the evolution of the battle-cruiser type, afterwards so highly developed in our own Navy in association with other features of the Dreadnought type of battleship. In his own country the designer of the *Tsukuba* and *Ikoma*, Constructor Vice-Admiral Kondo has been duly honoured on their account; it is interesting to note that he was a student at Greenwich in 1888-1890.

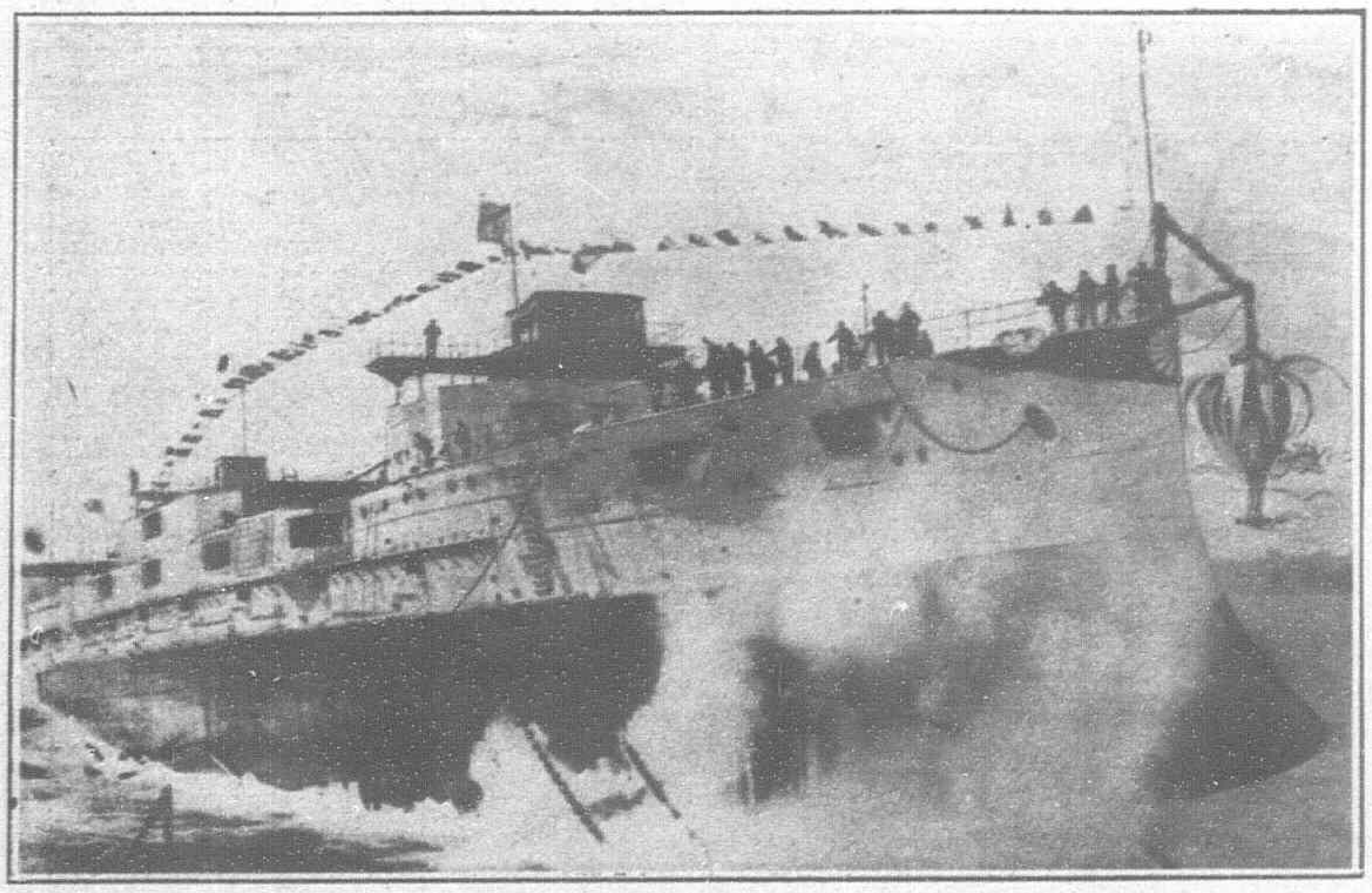
In the United States there have been a number of ships to which the Sperry Gyro Stabilizer has been applied, the largest being the troopship *Henderson*, of 10,000 tons displacement. Japan is the first country outside the U.S.A. to adopt this appliance; of dimensions, also, not previously attempted. The seaplane carrier *Hosho*, of 9,500 tons displacement, was completed at the Yokosuka Imperial Dockyard in 1922, and to make her more efficient she is fitted with the stabilizer.

On the engineering side developments have taken place corresponding to the progress made otherwise in maritime matters in Japan. In the Navy Department Engineer Rear-Admiral Fujii told us in 1911 of water-tube boilers of the "Miyabara" and the "Navy" type.

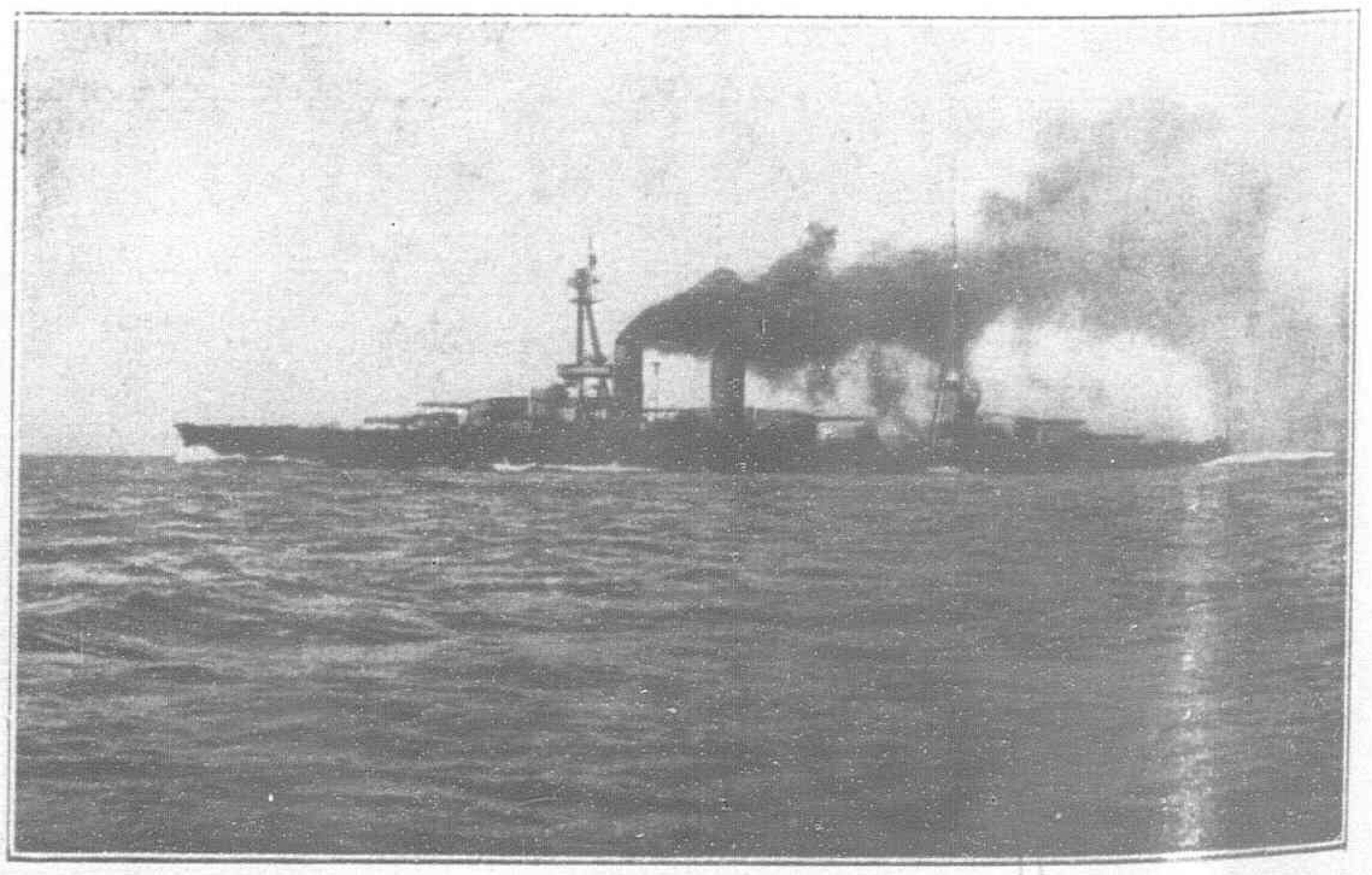
In the mercantile marine the first steamer to be built in Japan and driven by Parsons turbines (direct-coupled) was the *Tenyo Maru*, launched in 1907 and built by the Mitsubishi Shipbuilding Company at their Nagasaki shipyard. A little earlier this company purchased the right to manufacture the Parsons turbines, but imported from England those required for the *Tenyo Maru* and her sister ship, the *Chiyo Maru;* in subsequent years, they built successively turbines direct coupled, triple-expansion engines exhausting into low-pressure turbines, and geared turbines with both single and double reduction, the turbines in all these cases being of the Parsons type. In a somewhat similar way the name of the Kawasaki Dockyard Company is associated with the manufacture in Japan of the Curtis turbine. The company secured the licence and built turbines of this type for both naval and mercantile vessel. More recently Diesel and other internal-combustion engines are receiving very considerable attention, the three types most in favour being the Vickers, the Sulzer, and the Camellaird-Fullagar; the right to manufacture these engines has been secured by various engineering companies in Japan. Besides these principal types, other types of internal-combustion engines are being made by one and another of the numerous small engine works so characteristic of industrial Japan.

For the education of its future shipbuilders Japan, like this country, has always had the drawing offices of its various establishments, naval and private, as the main fields. In various places technical institutions and night schools have supplied, with more limitations, similar instruction to that provided by such institutions in this country.

The future labour conditions in Japan are going to be no less difficult than elsewhere. Owing to the rush for production during the war, wages rose to an inordinate extent, and, as elsewhere, the high cost of living has since operated against reduction. The present low value of the yen no doubt makes high wages less of an incubus; on the other hand, neither in steel material nor in wood is the country self-supporting, and the low exchange makes the cost of these and other imports a too serious set-off againt the gain in wages. A rather disturbing element also, in labour, only too noticeable during a period of lessening production, is a sort of principle that workmen once employed must receive compensation if discharged. In Japan, as perhaps everywhere, the solution, or even partial solution, of labour difficulties is a first necessity to the country's prosperity.



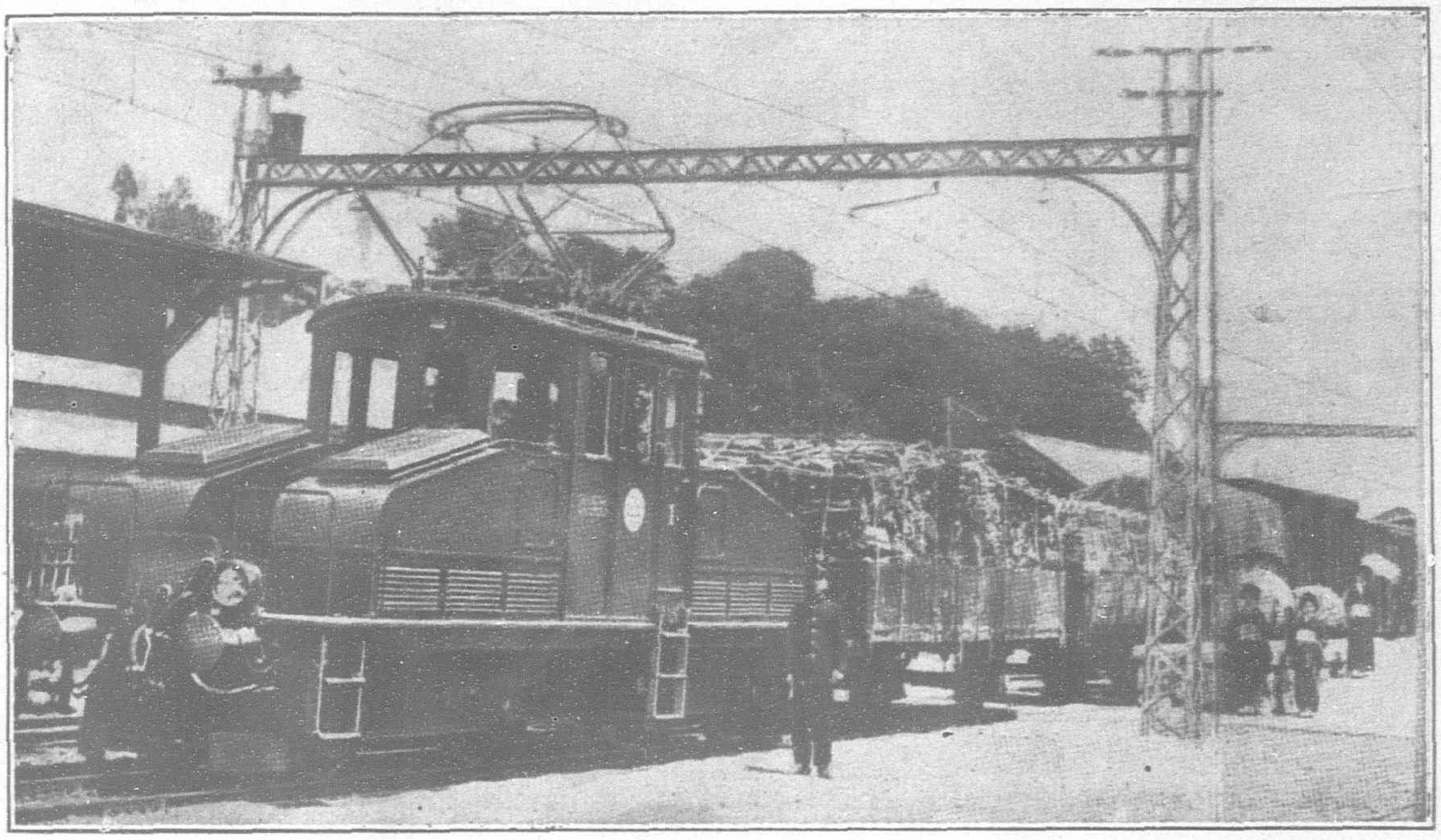
Launching of a Japanese Battleship



H.I.M.S. "Hyuga"

Direct-Current Locomotives for the Yoshino Railway, Japan

At the end of 1923 Brown, Boveri & Co. delivered to the Yoshino Railway Company of Japan a four-axle goods locomotive. Its performance under working conditions so pleased the purchasers that in May 1924 two more similar locomotives were ordered, which were delivered some time ago.



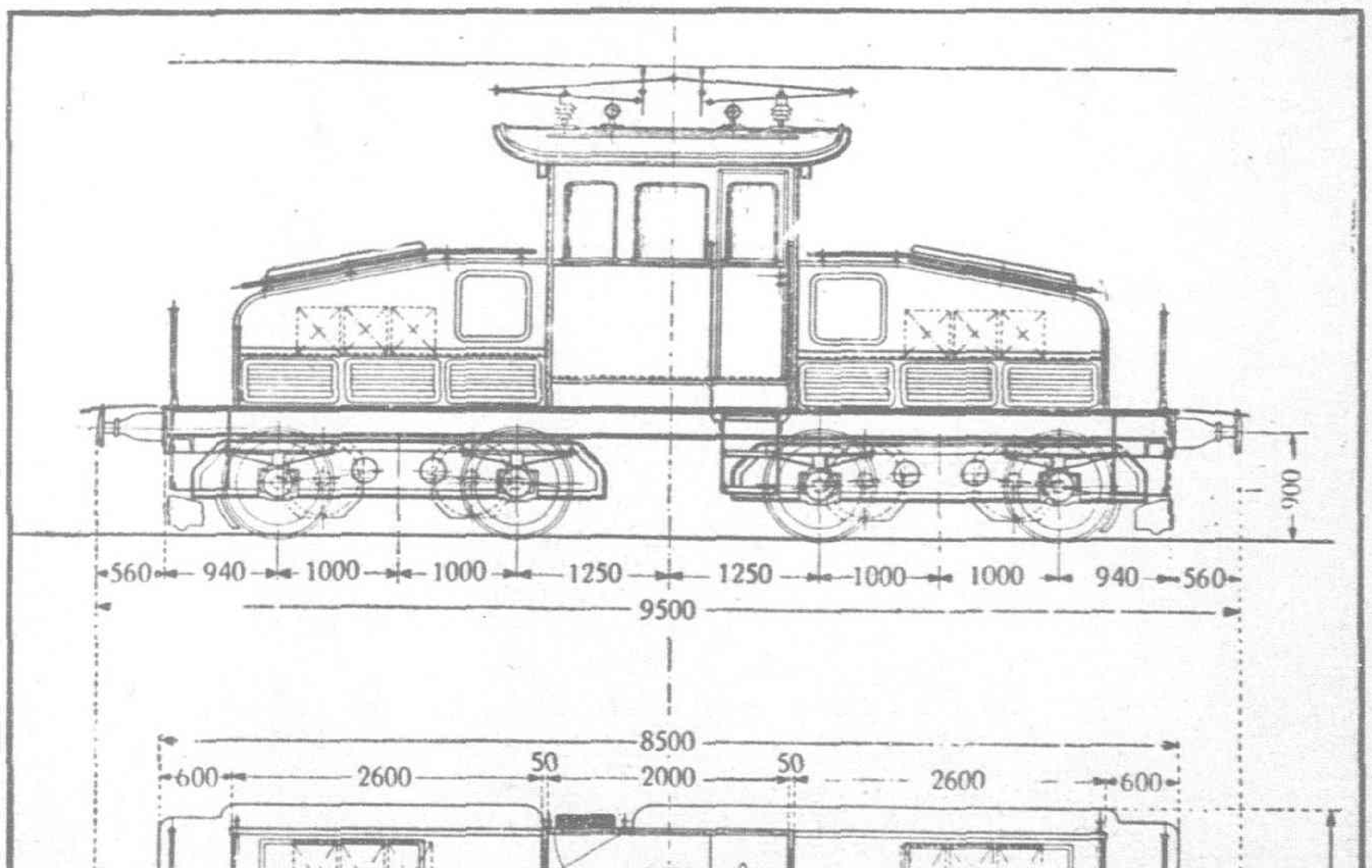
YOSHINO RAILWAY, JAPAN
Goods Train drawn by a B-B Locomotive in Shimoichiguchi Station

The track of the Yoshino Railway is situated in the mountainous country to the south-east of Osaka, and is famous throughout Japan for the magnificent orchards of cherry trees through which it passes. Every year, at the blossom time, groups of excursionists, including many pilgrims, visit the numerous temples and shrines found in the vicinity of Yoshino. The hills and mountain slopes near the railway are covered with thick woods; hence the transport of timber forms a considerable proportion of the traffic on this line.

The Yoshino Railway runs from Yoshino to Yoshino-guchi, where it connects with the Japanese Government Railways. The rails are laid throughout on their own separate track. The length of track is 11.6 km., and the gauge 1,067 mm. (3¼-ft.), which is the same as that used almost exclusively in Japan, especially on the Government railways. The maximum gradient on this line is 2 per cent.; the smallest radius of curvature on the open track is 160m., and 120m. where points occur; the admissible axle pressure is 8 tons per axle. A new line from Yoshinoguchi to Unebi, which is 13 km. in length, and includes short inclines of 3.3 per cent., is under consideration and will later be joined to the Yoshino Railway.

The Yoshino Railway was previously steam operated and was only electrified in 1922–23. The system of supply selected was 1,500 v. direct current; this is furnished by a sub-station, the mean trolley-wire pressure amounting to 1,400v. The trolley wire is suspended throughout from a single messenger wire, which in turn is supported by steel lattice poles fitted with cross members, the construction of which varies according to the span; the height of the trolley wire above the upper surface of the rails is 4.1-5.2 m.

The goods locomotives referred to were intended primarily for the transport of timber, but also for passenger traffic should it be necessary. The purchaser's stipulated perform-



Plan, Elevation and End Elevation of a B-B Goods Locomotive for the Yoshino Railway

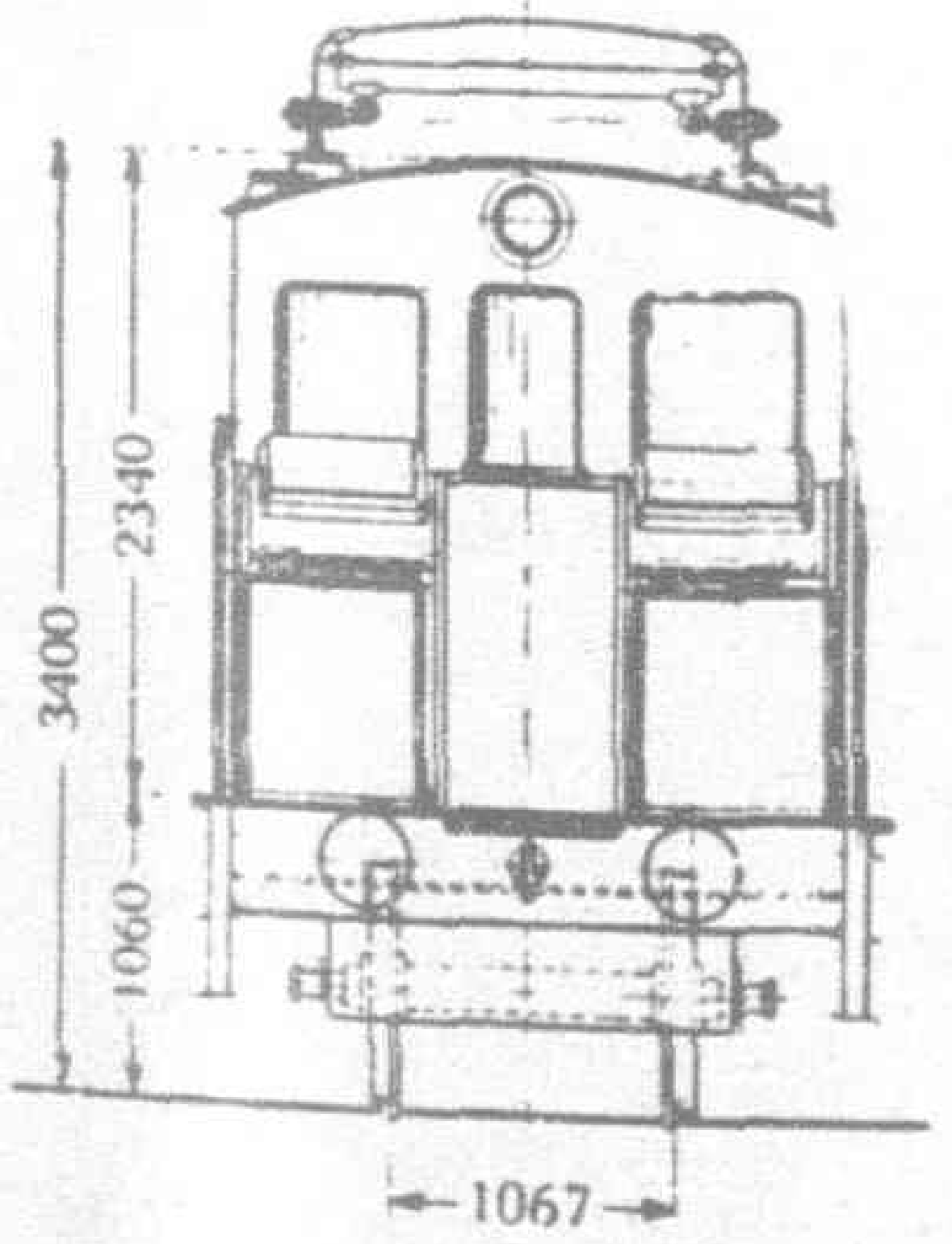


Fig. 1.—Plan, Elevation, and End Elevation of a B-B Goods Locomotive for the Yoshino Railway

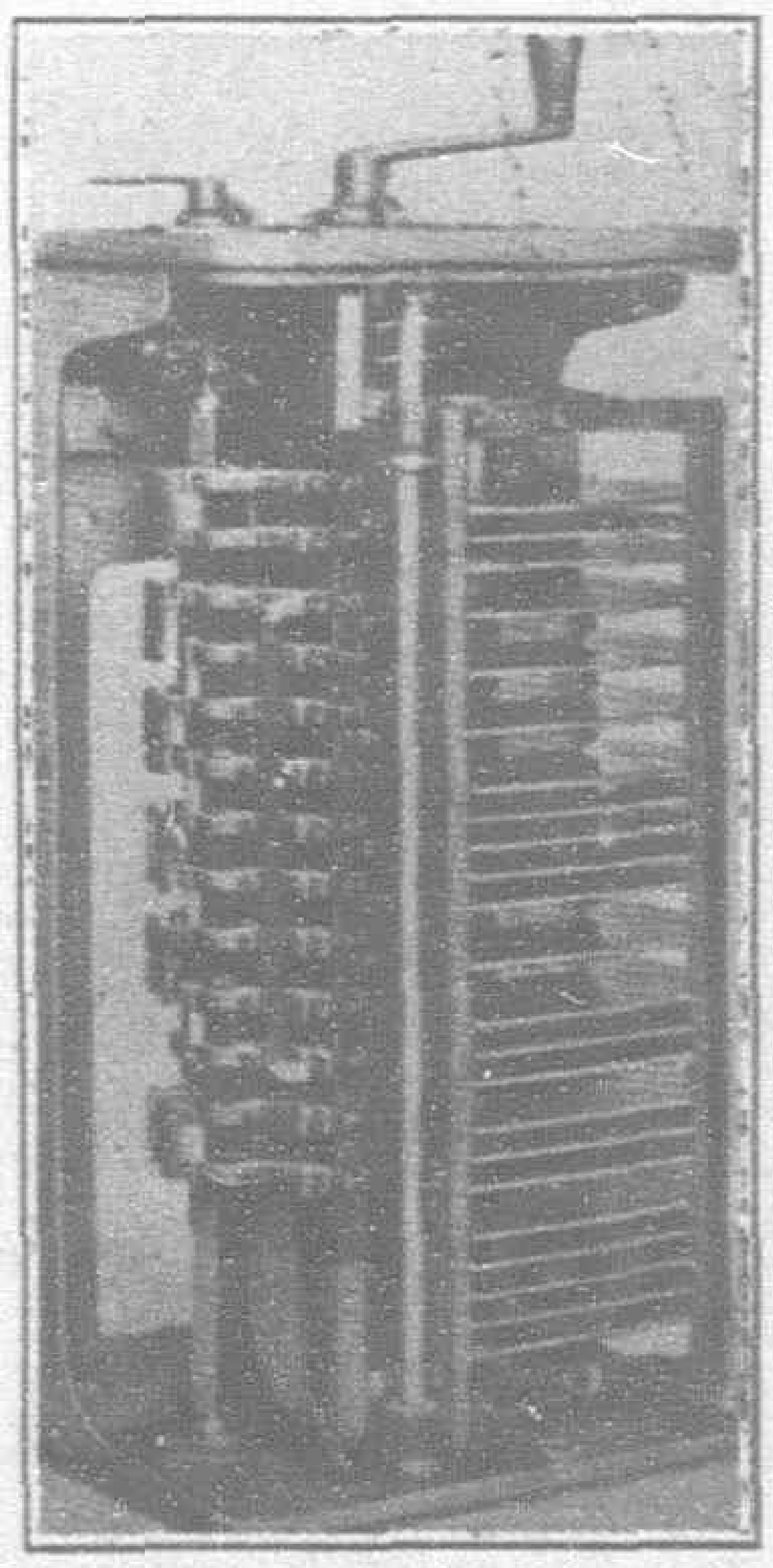


Fig. 2.—Cam Controller with casing removed

ance was, that when loaded with 150 tons, the locomotive should be capable of attaining a speed of 19 km. per hour on a 2 per cent. incline, and a maximum speed, on the level, of 40 km. per hour. To fulfil these conditions the locomotives were designed for a continuous rating of 240 h.p. at the shafts, to be developed by the driving motors running at 750 r.p.m. with a trolley-wire pressure of 1,400 v. The chief particulars are given in the following table :—

Length over buffers	9,500 mm.
Length of frame...	8,380 mm.
Maximum width of body	2,300 mm.
Maximum height of roof above rails	3,400 mm.
Diameter of driving wheels	860 mm.
Wheel base of bogies	2,000 mm.
Distance between bogie centres	4,500 mm.
Weight of mechanical portion	15.4 tons
Weight of electrical portion	8.7 tons
Total weight of locomotive	24.1 tons
No. of motors	4
Type	direct-current, series-wound
1-hour rating per motor at tread	75 h.p.
Continuous rating per motor at tread ...	60 h.p.
Terminal voltage across each pair of motors...	1,400 v.
Gear ratio	4.93 : 1

Fig. 1 gives a general idea of the design and dimensions of the locomotive, while on the preceding page is a photograph of a locomotive attached to a goods train.

The mechanical part consists chiefly of two two-axle bogies and a rolled-steel frame upon which is built the small body of the locomotive and the two extensions or end casings. The central portion comprises the driver's cab, which is fitted with two complete driver's stations situated in each case to the left hand looking in the direction of travel. This arrangement is contrary to the usual practice of providing a single central driver's station. The cab is constructed of steel and wood, with a double wooden roof to protect the driver from the heat of the sun. Three windows, one of which is moveable, are provided on every side of the cab, and two doors are fitted.

On each of the end walls of the driver's cab a control desk is provided, which contains a controller, control valves for the current collector, and for the main switch, also the compressor motor and an air-brake valve. The steel end casings at the front and rear of the cab contain the starting resistances, the main switch, the air compressor, the lighting battery and various fuses. As shown in the photograph on the preceding page, each of these casings is made in two parts with a clear gangway between them. A means of inspecting the enclosed apparatus is provided by inspection covers, partly interlocked with the actuating valve for the current collector, fitted in the control desk, the walls of the cab and the end casings. Certain inspection covers, including those of the driving motors, can be opened from the above-mentioned gangways between the two parts of the casing. Each end casing has louvred openings and an air intake for cooling the resistance and for supplying air to the compressor.

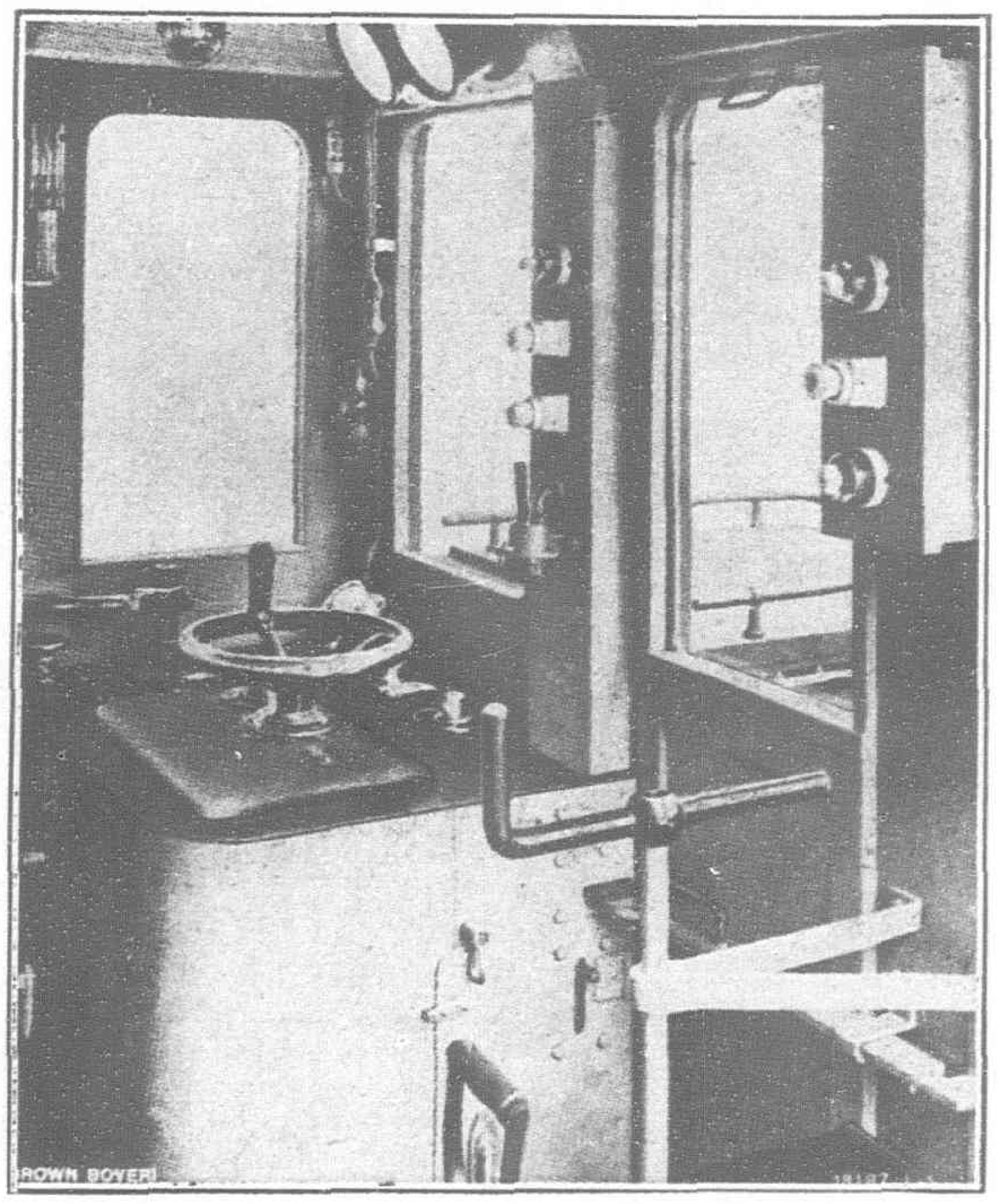


Fig. 3.—Interior of driver's cab, showing one of the control desks

The underframe of the body is made of rolled steel sections. In accordance with the standard practice of the Japanese Government railways, central draw-gear and double-buffers are fitted. Both bogies are constructed of sheet steel and rolled steel sections. Simple laminated springs are employed which are supported on the axle-boxes ; these are fitted with pad-lubricated journal bearings of the usual type. The eight brake blocks of the locomotive can be applied by hand, from either of the driving positions, or by a direct-acting Westinghouse compressed air brake equipment which works on the same linkwork as the hand brake. The mechanical parts of the locomotive have been constructed by the Swiss Coach Works, Schlieren, near Zurich.

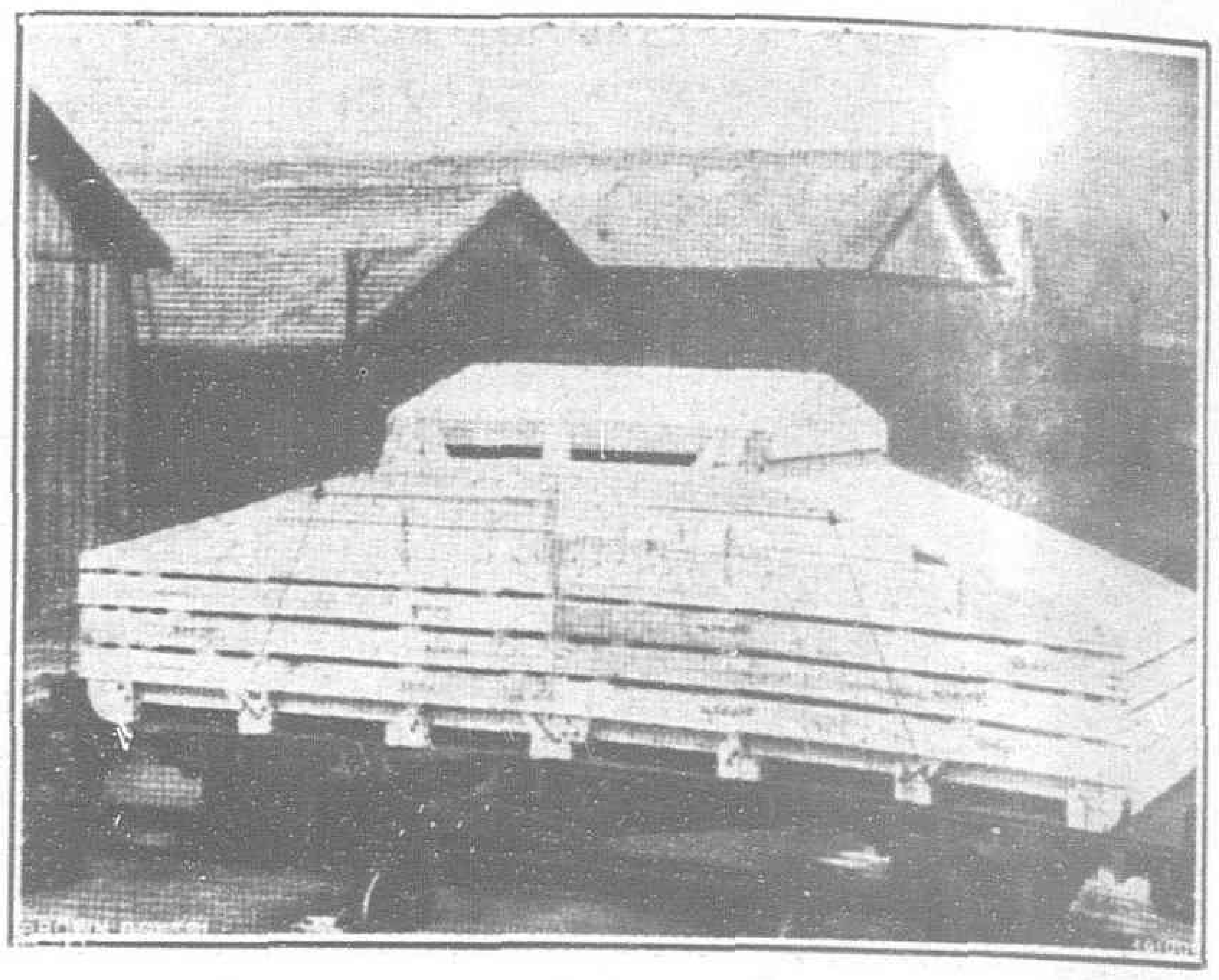


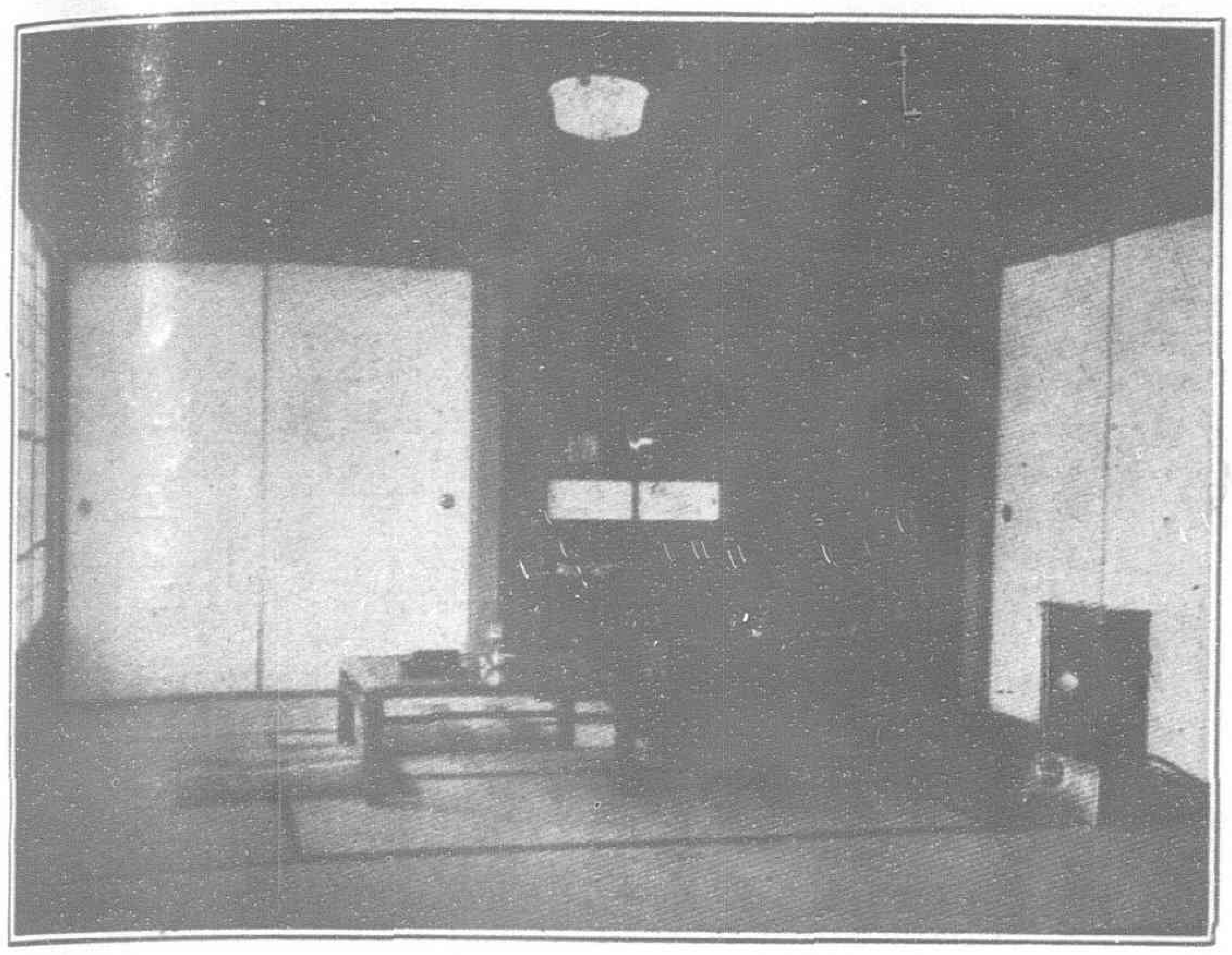
Fig. 4.—Locomotive ready for transit

The electrical equipment is as follows :—Each axle is driven by a self-ventilated D.C. series motor, Type GDTM6, as used for tramways. These motors have a one-piece casing. They can be used easily in a metre-gauge locomotive so that the field of application of this type is considerably widened. The motors in each bogie are permanently connected in series, but the two groups so formed are arranged for series-parallel control. Contrary to the practice hitherto general for pressures in excess of 1,000 v., a controller with remote control from the control desk is not employed in this case, but each desk has incorporated in it a vertical hand operated controller externally resembling those used on tramcars. These differ from tram controllers, however, in that they do not make and break the circuits by means of contact segments and contact fingers mounted on a drum ; but as with the larger electric motor coaches and locomotives on high-tension railways, the main drum is replaced by a number of contractors controlled from a cam-shaft and provided with electro-magnetic blow-out coils to ensure reliable interruption of the arcs formed. The controller is arranged for series-parallel control of the two pairs of motors, it is provided with six series and four parallel running positions, and, on rotating the cam-shaft in the reverse direction, resistance braking is obtained for seven positions of the control lever. By means of a second drum the direction of the locomotive can be reversed, or either pair of motors can be disconnected should a defect develop (Fig. 2).

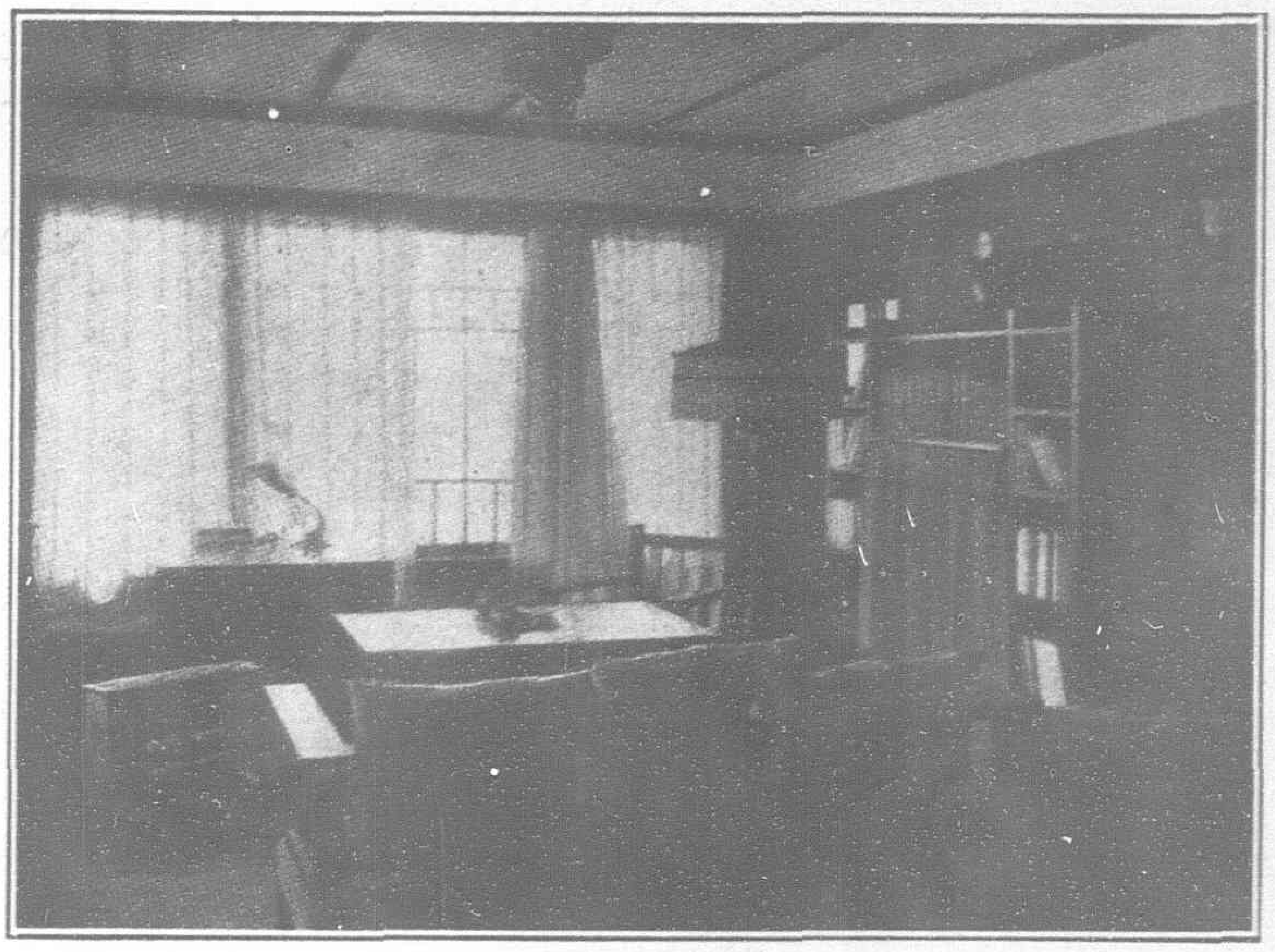
The starting and braking resistances consist of cast-iron elements assembled in frames situated under the end casings of the locomotive. The automatic main switch and the pantograph current collector are operated pneumatically from the control desk. A motor-compressor set, Type GC2, supplies the compressed air for the above apparatus and also for the Westinghouse brake equipment. This set, which is supplied with current at trolley-wire pressure, compresses 590 litres of free air per minute to a pressure of 4.5-6 kg. per sq. cm. The current for lighting the locomotive is supplied by a small 12 v. accumulator battery, which is periodically recharged at a charging station. The driver's cab is heated by two heating elements and two electrically-heated foot-plates, all connected in series and supplied with current from the trolley wire.

The electrical equipment was constructed by Brown, Boveri & Co. in their works at Baden and Munchenstein.

Messrs. Smith, Major and Stevens, Ltd., of Northampton, have published another interesting illustrated catalogue, showing the tremendous improvements that have been made in door springs, the manufacture of which has apparently developed into a science. The purpose of a door spring is to make it possible to open and close a door with a maximum of ease and a minimum of noise. A reading of the catalogue easily shows how the products of this firm accomplish this purpose.



Tea Room of Japan's First Home Electric



The Library on Second Floor, furnished after the manner of the Occident

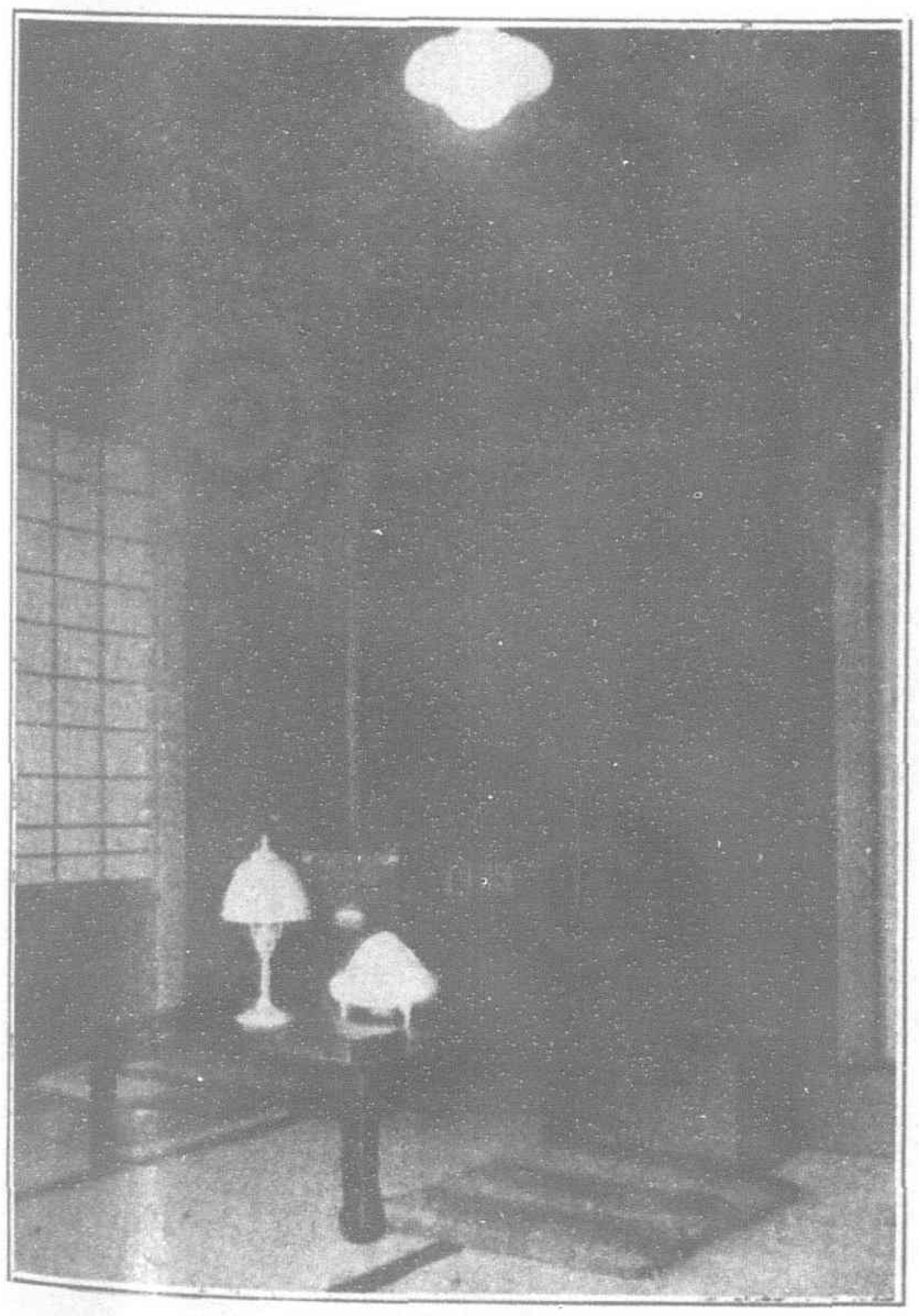
The Opening of Japan's First Home Electric

F. D. Fagan, Tokyo Electric Company

WHEN an electric home for Japan was proposed there seemed to be no association under whose auspices it could be demonstrated. Those interested in the electrical industry have not, up to date, formed an association similar to that of the Contractors, Dealers and Jobbers, and the Society for Electrical Development that exist in America, but the tendency is toward the forming of such association in Japan, and within the next six months some general association is likely to be formed that will function to the interests of all the electrical industry.

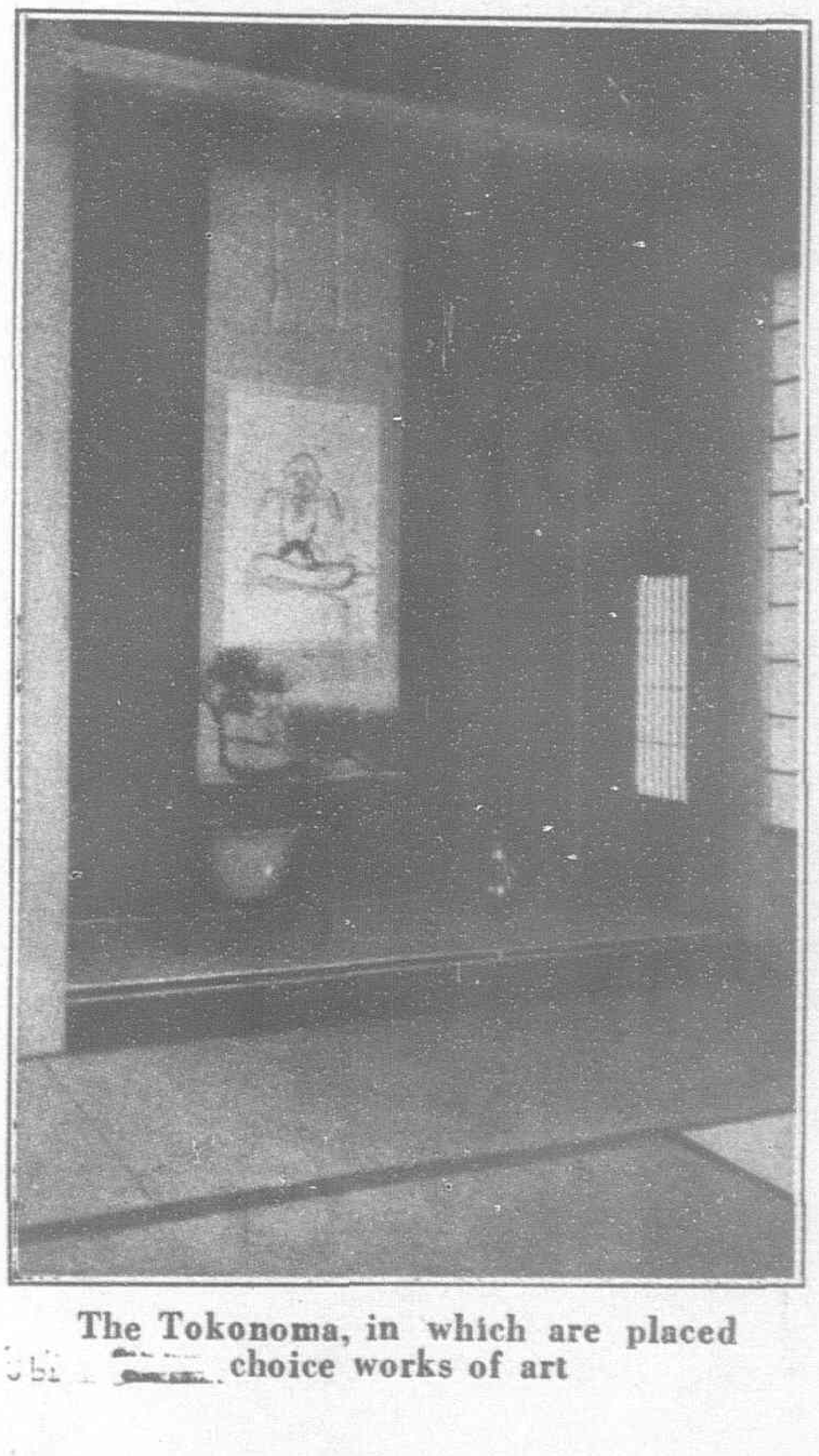
To introduce the Home Electric a committee was appointed by the sales manager of the Tokyo Electric Company, and after a few weeks' investigation arrangements had been made with a representative group, including one of the leading newspapers of Tokyo, the *Tokyo Nichi Nichi*, a building company, a real estate company, an electric street car company, a department store, a manufacturer of electrical heating and cooking devices, and the Tokyo Electric Company, a manufacturer of incandescent lamps. These companies formed a committee and arranged for the division of expense and investment in the building of an electrical home. The real estate company agreed to take over the home at the expiration of the demonstration period.

The home was built, and consisted of entrance hall, living room (foreign style), sun parlor, dining room, kitchen and bath-room (Japanese style) on the first floor. On the second floor a library (foreign style) and bedroom (Japanese style). These rooms were furnished and completely equipped with electrical devices for lighting, heating and cooking, the kitchen being a complete electric one in which was installed a two-plate electric range.



Bedroom

On October 11 the opening ceremony was held. There were in attendance Japanese girls trained to talk on the uses of various devices, and one of them was assigned to each room. As the home was open from 8.00 a.m. until 8.00 p.m., two shifts of girls were employed. About eighty invited guests attended, it not being customary to open such affairs by inviting the general public. Viscount Shibusawa, one of the best-known men in Japan, made a short opening address and pressed the button that started the electricity through the house. Many important officials, college professors and prominent members of the electrical industry were at the opening ceremony. The home was opened to the public October 12, when a large group of ladies, especially invited by the *Tokyo Nichi Nichi*, inspected the electric home and listened to lectures on home lighting and home building. On October 16 the dealers of Tokyo were invited to be guests of the Tokyo Electric Company and, after visiting the Home Electric, took part in a track and field meet, where all were entitled to enter. Approximately one thousand dealers accepted the invitation, in spite of the fact that it was a rainy day. This was the first gathering of electrical contractors and dealers ever held in Japan, and was reported as a very successful day, and had the effect of bringing about a better feeling between the contractors and dealers.



The Tokonoma, in which are placed choice works of art

On October 26, at 1.30 p.m., the Princess Dowager was a visitor, and was very much interested in the various demonstrations of the use of electricity in the home. Many other prominent people were reported as visitors, among them Viscount Shibusawa, Baron Mitsui, Mr. Nakamura, Mayor of the City of Tokyo, Dr. G. Yamakami, Dr. Yamamoto, Dr. B. Natomi, Dr. K. Kishi, and Mr. Y. Kamata, former Minister of the Department of Education.

On October 29 a lecture on home electrification was given in one of the large meeting halls near Uyeno Park, and several hundred people attended.

During one week of the time that the home was open a special demonstration was held by the Mitsukoshi Department Store, which was interested in the Home Electric. This demonstration presented a purely Japanese home completely equipped electrically. It is estimated that in excess of 150,000 people attended.

The Home Electric was located in a suburb of Tokyo called Chofu, on an electric line running between Kamata and Meguro. The reason for selecting this particular site was that it was not the desire of the committee to secure a large number of curiosity seekers who were not really interested, and as the expense from the city of Tokyo was from 25 cents to 35 cents, we feel that all who came were interested parties and not merely attracted by curiosity. In Japan it is not customary to open a demonstration of this kind to the public all day. The morning was reserved for invited guests, when they were privileged to see the home between eight and twelve o'clock.

The weather was not as favorable during the twenty days as we should have desired, as we had seven cloudy and rainy days, but in spite of the weather and the fact that it was the first Home Electric to be built in Japan there were 16,000 visitors, the largest attendance being on the last day, 2,636 people. The smallest attendance was 44 on a day when there was a pouring rain.

The general opinion of all interested is that the Home Electric was a great success, and those investing money and sharing part of the expense are well pleased with the result. The fact that such progress has been made here is of great significance to those interested in the development of the electrical business in Japan.

The home was purchased prior to its closing day by Mr. Shibusawa, and he will make it his permanent residence.

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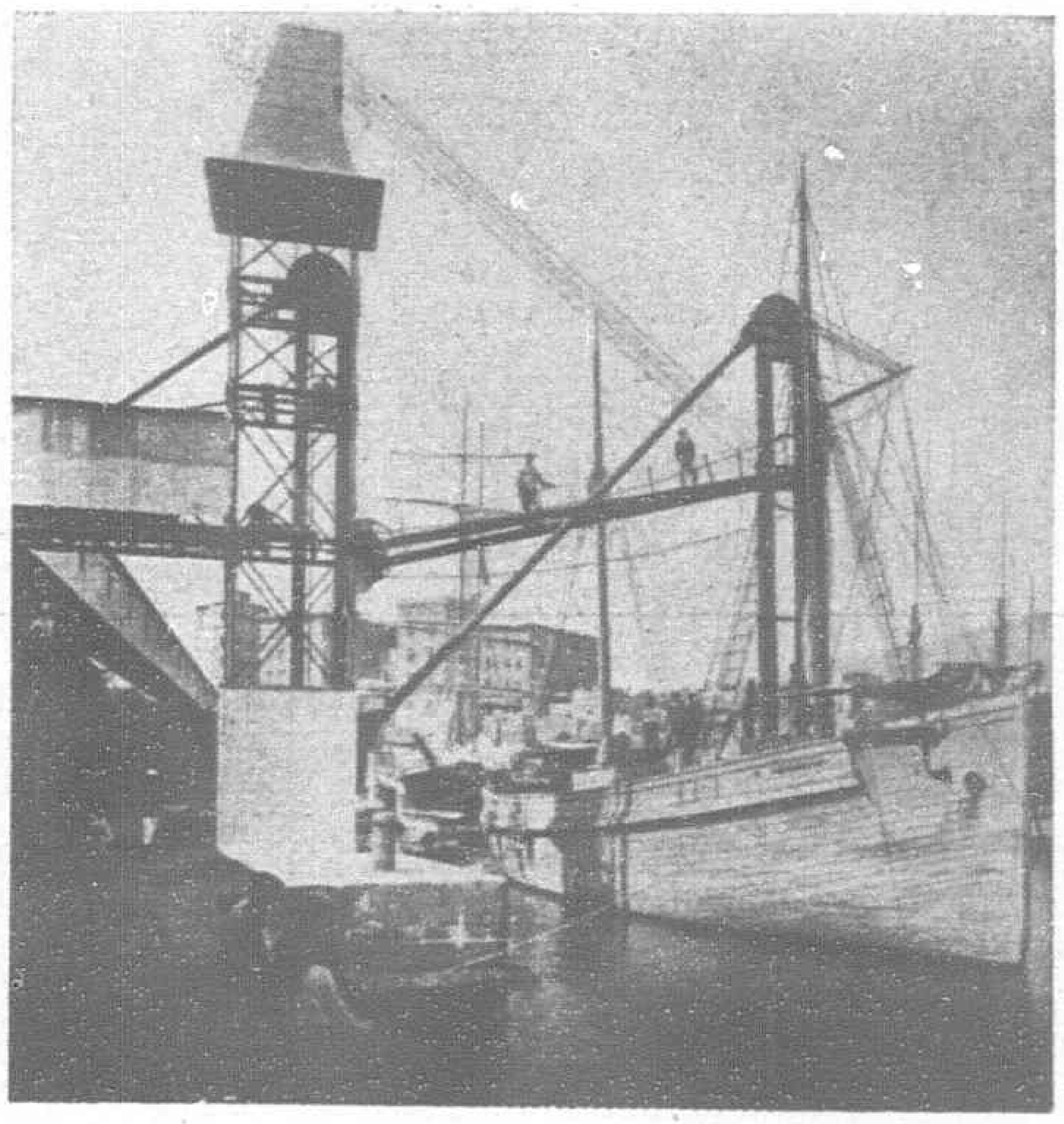

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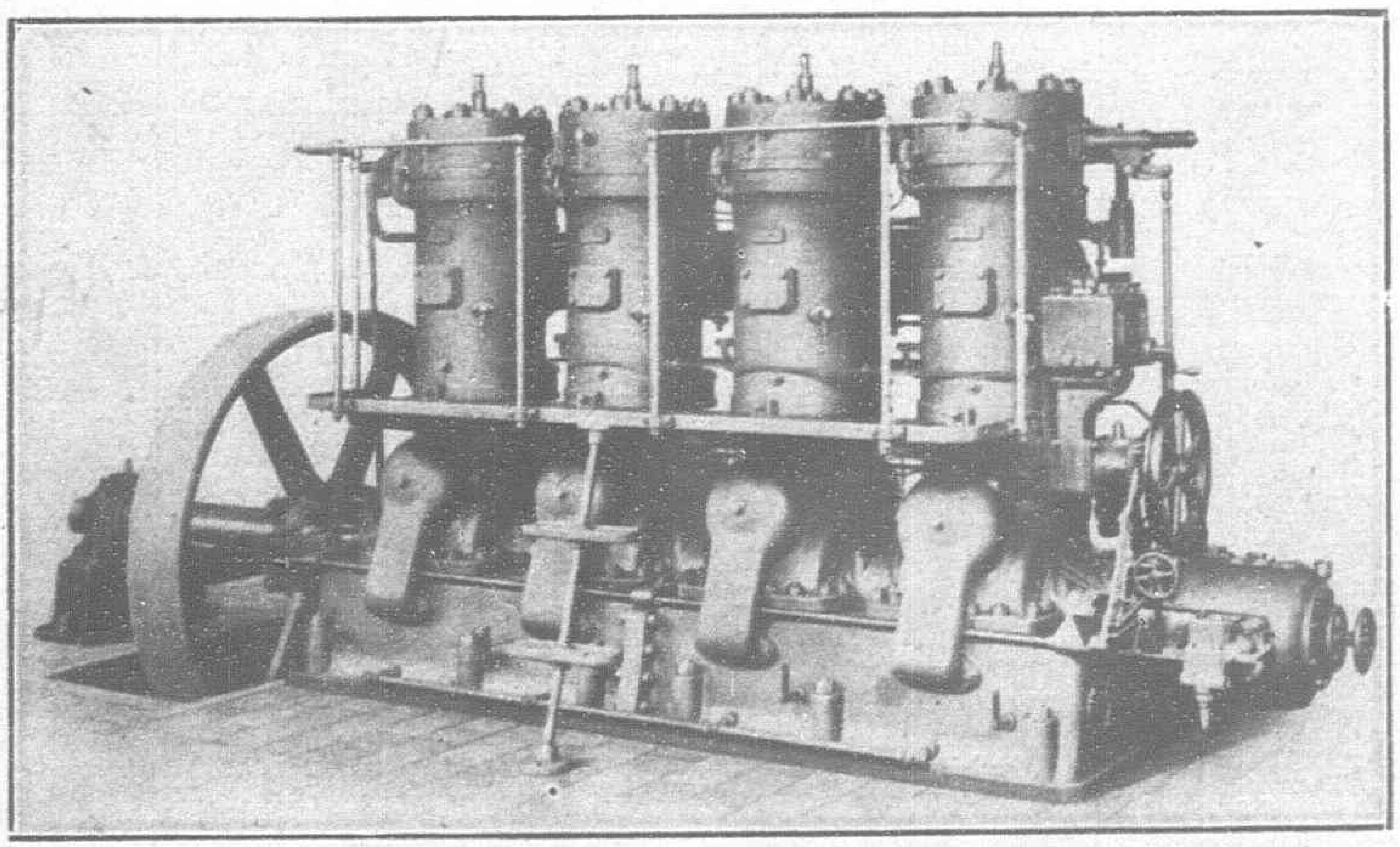

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